

The IRON AGE

April 16, 1959

A Chilton Publication

The National Metalworking Weekly



Stampings:

Reverse Trend In

"Make or Buy"? P. 77

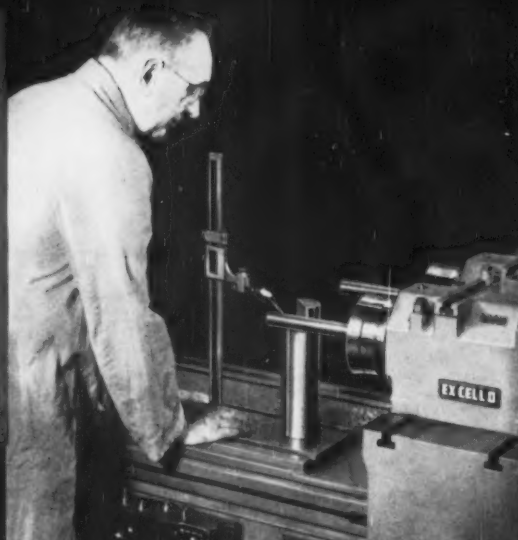
**Behind the Scenes
Of Steel Labor Crisis – P. 82**

**Quality Control Leads
To Better Design – P. 115**

Digest of the Week – P. 2-3



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58-39

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Evaluating the Machinability of Alloy and Carbon Steels



To produce a useful part, most steel has to be shaped by one or more of the metal forming methods. One of these is metal cutting or machining, which changes the shape, size, or finish of a workpiece.

Alloy or carbon steels are often received from the mill in the raw form of bars, forgings, or castings. The steel is placed in a suitable machine, such as a lathe, multiple-spindle automatic bar machine, drill press, milling machine, or one of a number of other types. Metal is then removed from the steel stock until it has acquired the desired shape. This is accomplished by causing motion to take place in the sharp-edged cutting tool, or the piece of steel, while they are held in contact with each other. Cutting tools, such as drills, tool bits, milling cutters, and the like, are made from highly-alloyed steel (tool steel), cast alloys, sintered carbide, or even ceramic material.

During machining, the metal is removed in the form of chips which may be of any length, from the short, well-broken type, to the long, stringy and continuous variety—depending upon the nature of the steel, the shape or geometry of the cutting tool, the speed and feed at which the cutting is done, and the coolant or cutting fluid applied.

"Machinability" of steel refers primarily to the ease with which it can be reduced to its final shape. It is measured by the speed and feed at which it can be cut, the quality of the surface finish produced, the length of time the tools will

last, and the kind of chip formed in cutting. In a "free-machining" grade of steel, for example, high speeds and feeds can be used, tools will stand up well, surface finish will be good, and chips well broken.

Machinability is evaluated in the shop by the number of pieces having a satisfactory finish, within the required dimensional tolerances, that can be produced in a shift, or a day, with adequate tool life.

It can be appreciated that the study of the cutting of metals involves a large number of variables. These may be grouped in the following way:

1. Steel Analysis (Process, composition, microstructure, and mechanical properties)
2. Machine Tool (Condition, tool accessories, range of cutting speeds and feeds with ample power, etc.)
3. Type of Machining Process (Turning, milling, forming, broaching, etc.)
4. Cutting Condition (Speeds, feeds, and depth of cut)
5. Cutting Tool (Composition, treatment, hardness, size, shape, grinding and surface finish)
6. Cutting Fluid (Characteristics, application, and volume)

From this number of complex factors, laboratory tests and investigations have developed experimental data by using single variables, such as steel analysis, tool analysis, tool shapes, and cutting fluids. This information has proved to be a useful guide when combined with industrial experience; for no test method by itself has yet been developed that will include all the characteristics of a specific single or multiple-machining operation.

Bethlehem metallurgical engineers have had long and varied experience and knowledge on the machinability of alloy and carbon steels. They will gladly give you any help you may require in connection with machining problems.

In addition to manufacturing all AISI standard alloy steels, Bethlehem produces other than standard analysis steels, and the full range of carbon grades. Call your nearest Bethlehem sales office for information.

If you would like reprints of this series of advertisements, please write to us, addressing your request to Publications Department, Bethlehem Steel Company, Bethlehem, Pa. The subjects in this series are now available in a handy 44-page booklet, and we shall be glad to send you a free copy.

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The IRON AGE

April 16, 1959—Vol. 183, No. 16

Digest of the Week in

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OXYGEN STEELMAKING

New Furnace Marketed—Dravo Corp. now has the right to design and sell Stora-Kaldo oxygen steel-making furnaces developed in Sweden. Advantages listed include heat economy and control. P. 80

NUCLEAR POWER

Peaceful Uses—The 1959 Nuclear Congress made it quite clear that this is a field to keep an eye on. It's a steadily growing market for metalworking. P. 81

STEEL LABOR TACTICS

Ike's Influence—President Eisenhower's recent statements put labor and management both on the spot.



But management seems to be getting the worst of it. Hope fades for a peaceful settlement. P. 82

CHOOSING EXECUTIVES

Long Range Job—You can increase your chances of choosing the best management talent by planning up to 10 years in advance. Services

Metalworking



of trained psychologists should be sought. P. 84

AUTO SALES REVIVE

Spring Is Back—For the first time since 1955, new car sales are returning to the "traditional" spring upturn pattern. Most makes report significant increases in March orders. P. 93

FEATURE ARTICLES

QUALITY CONTROL

Leads to Better Design—To keep pace with advancements in saw chains, a manufacturer puts heavy stress on quality control. The company's four-step program starts with design and follows the product through delivery to customer. It also takes in the broad area of research and development. P. 115

STAINLESS ALLOYS

Four New Types—A new series of molybdenum-containing 18-8 type alloys fills the need for a single alloy with both high strength and corrosion resistance. Each can be readily cast and some can be rolled and forged. P. 118

GAGE BLOCKS

Especially for Shop Use—Containing only 54 pieces, a new type of precision gage-block set provides much-needed dimensions for shop inspection and machine setup work that normally would require 121-

piece sets. Small but practical, it will measure all standard snap ring grooves, O-ring grooves, and keyways. P. 122

GEAR HONING

In Production Cleanup—A fast honing cycle eliminates the need for costly detection and cleanup of nicks and burrs. Two honing units shift easily for a wide range of gear sizes. P. 124

FORMED STEEL TUBING

Design Controls Costs—Where cost is the main factor, there are practical bounds in working with welded steel tubing. It pays to know the merits of the many methods of forming. P. 126

MARKETS & PRICES

INCINERATORS

A Growing Market—How and where to get rid of refuse is becoming a nagging problem to industry. It opens a new era for the relatively small commercial incinerator industry. P. 85

NEXT WEEK

STEEL SERVICE CENTERS

Going Mechanized—By doing more metal processing, steel service centers are getting a larger share of the market. Next week's feature will show how a modern operation goes about developing new service for its customers.

REVERSING THE TREND: The "make or buy" battle is a continuing one to independent stampers. Executives like C. C. Caditz, left, president of Northern Metal Products, with his manufacturing vice president, John Prebish, believe they are winning the battle. P. 77

STEEL USE IN FARWEST

Gains of 19 Pct—According to L. B. Worthington, president of Columbia-Geneva, steel shipments in West this year will increase 19 pct over '58 levels. Construction activity will be a big factor. P. 99

MACHINE TOOL

An Economic Force—A federal official told the machine tool distributors they are a definite force in our economic picture. And he explains why. P. 101

BATTLE AGAINST TIME

Steel Users Face Problems—Time may be running out for some steel users who had hoped to build a comfortable inventory against a possible strike. Next two months will be critical. P. 151

INVENTORY CONTROL

Worthwhile Sales Aid—Tight inventory control pays sales dividends, says Joseph Lasko, purchaser for American Stamping. It gives company competitive edge, aids in unexpected orders. P. 152





How B&W JOB-MATCHED TUBING
helps you make a better product

- ... The complete range of sizes and types of finish plus close tolerances provide freedom of design... *helps you make a better product*
- ... Quality controlled from start to finish helps provide a wide range of end use possibilities... *helps you make a better product*
- ... Controlled mechanical properties provide flexibility of design... *helps you make a better product*

These are just some of the reasons why it pays to specify B&W Job-Matched Tubing.

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SUCCESS STORIES

B.F. Goodrich distributors helped these customers cut costs. Can they help you?

Rock 'n' roll

Getting tons of rock up a steep incline to the top of a building (see picture) was causing plenty of trouble at a Pennsylvania quarry. The angle is too sharp for a regular, smooth-surfaced conveyor belt. The rocks would have tumbled back down faster than the moving belt could carry them up. It looked for a time like the incline angle would have to be reduced—a longer, more expensive conveyor used.

But after discussing it with a B.F. Goodrich distributor, plant engineers decided to try a special kind of conveyor belt developed by B.F. Goodrich. This "Riffle Grip" belt, as it is called, is made with a series of extra-tough rubber ridges molded into the cover. The tread that these ridges form holds the rock in place.

This B.F. Goodrich belt was tried, and it works perfectly. It takes some 500 tons of rock an hour on the long, steep ride up to the crusher. There's been no slipping, no sliding, no problems of any kind.

Logging a record

At a Pennsylvania paper plant, big logs roll down a chute and crash onto a conveyor belt. They land edgewise, endwise, flat, any way they happen to

tumble out of the debarking drum. Ordinary belts were often cut; the fabric soon weakened.

Then a B.F. Goodrich distributor recommended a B.F. Goodrich cord belt. That was four years ago. The belt lasted longer, carried more logs than any belt ever used before. Paper company officials were so pleased that the distributor recently sold them a second B.F. Goodrich cord belt exactly like the first.

Caution on curves

A coal mine in West Virginia has a big cone-shaped tank where coal is washed in water and sand. Carrying the sand and water to the tank are 42 lengths of B.F. Goodrich rubber hose. The chief engineer knew that if metal pipe were used it would wear through at bends and curves in no time. The B.F. Goodrich hose will last six or seven years—many times longer than pipe.

Clean haul

A manufacturer of laundry equipment designed a conveyor to carry wet clothing from a large hotel-type washing machine to an equally large clothes dryer. Several kinds of conveyor belts were tested on the unit, but the B.F. Goodrich "Griptite" belt was the

only one that would carry the wet clothing up an incline and keep it from slipping back into the bin. This is the same B.F. Goodrich belt that's so successful at carrying all sorts of packages up and down steep inclines.

Feat of clay

A clay-products company in Mississippi was using an elevator belt to carry wet clay to dryers. The clay is so heavy that the buckets loaded with it kept working loose from the belt, lodging in the elevator framework, causing many hours of downtime. Belts lasted less than six months.

Then a B.F. Goodrich distributor sold the company a B.F. Goodrich elevator belt made with Nyfil fabric. Because this belt is so much stronger, buckets can't pull out any more; belt life is more than doubled, may be three or four times as long.

Customer not only made great savings in downtime and belt replacement costs; he actually paid less for the 7-ply Nyfil belt than he had been paying for 8-ply cotton belts.

New product

Abrasion-resisting sheet rubber. B.F. Goodrich "Armorline" is an adhesive-backed rubber sheeting material for lining chutes, launders, other equipment exposed to abrasion. Can also be used to patch worn places in rubber belting. Special cement furnished by B.F. Goodrich provides a tight bond. Application is easy; requires no expensive equipment.

New catalog

Link V belting. Catalog No. 1725 describes B.F. Goodrich link-type V belting, which can be joined by hand in any length needed. Belting can be installed in minutes without dismantling a drive. Sizes to fit all standard sheave grooves.

For more information

For full information about any product described on this page, see your B.F. Goodrich distributor or write B.F. Goodrich Industrial Products Co., Dept. M-564, Akron 18, Ohio.

B.F. Goodrich
industrial
rubber products



Hurrying upstairs with a mountain of rocks—see "Rock 'n' roll!"

SPECIAL REPORT

Steel Buyers Get Strike Fever: Hedge Buying Begins

IRON
AGE

June is still a long way off, but steel users are scared.

through May and April. The lash-up in steel deliveries should

May Be Too Late—The situation in Pittsburgh indicates a nationwide trend is in the making. Pittsburgh had

Market Outlook

STEEL

With Stocks at Low Ebb, Rush Is on

DEMAND for steel is rising rapidly as consumers strive to replenish low inventories. Fabricators who let their stockpiles decline last year are suddenly realizing that they don't have enough metal on hand.

porary." Taking an opposite stand (though he foresees no allocations), a market analyst declares: "I think we'll

Report on Ryerson stocks as steel squeeze tightens

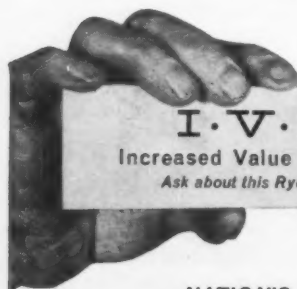
Steel stocks at Ryerson are at an all-time record high—in tons, types and sizes. Fortunately, Ryerson anticipated a squeeze situation and began laying in stocks of steel *months ago*. You can depend on Ryerson to furnish steel of high, uniform quality and to maintain its regular policy of fair, published prices.

Avoid loss of cost controls

Don't let the steel squeeze trap you into scrapping cost control programs based on

sound inventory policies. You've proved the economies of avoiding long-term commitments—and the high "cost of possession" that goes with them. Call Ryerson for risk-free steel buying and get the steel you need when you need it—cut to exact size and ready to use.

Your Ryerson representative is well qualified to review the facts and help you get the maximum value for your steel-buying dollars. Ask him to analyze your requirements with you the next time he calls.



I.V.B.M.
Increased Value in Buying Metals
Ask about this Ryerson Plan for 1959



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Industrial Frustrations

Don't Let Them Get You Down

Let's knock off the old argument that today times are rougher than days gone by. Maybe they are but that doesn't cut any ice.

There are many current—and potential—problems today that are anything but calming. Most of them seem to have no solution. But we have to live with them. If we don't, then we might as well hand the job over to someone else. Someone who can ride with the punch while still looking for an answer and without sacrificing any major principles.

The labor outlook is enough to scare anyone. There seems to be no understanding by a large section of labor that capitalism and labor must lean heavily on each other if both are to survive. If one goes down the other falls too.

Probably some progress is being made but it isn't showing up too well at this time. While we hope and strive for this understanding there are some things we can do.

We can see that emotionally mature men represent management at the bargaining table. We can see that they have authority to deal with labor's people. We can furnish the support to say "no" even if it means setbacks that at first seem catastrophic. Out of hard decisions and

industrial courage comes knowledge that eventually helps labor and capital.

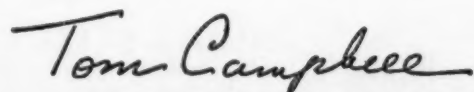
As Government plays a bigger part in our lives we must oppose it when it is in the wrong. To do otherwise is to lose by default. When we do that no one knows—or cares—why we lost.

If we want to prevent fiscal suicide, then we have to keep from talking out of both sides of our mouth. We can't yell for sane spending while we join the free-loading lineup.

When new ideas are offered we must give them a fair shake. Under guise of "practical" criticism we can't allow our old phobias and entrenched mannerisms to sandbag things that will help us industrially. Soul-searching is a mild name for this process of being brutally honest.

If we are ill informed—or uninformed—about things outside our own borders it could be our undoing. Parochial thinking of any kind can, in this day, ruin our future business prospects: Another way of committing industrial suicide.

Even as we face and ride with these industrial frustrations we have to fight for the ageless principles of integrity, thrift, and honesty. The day we don't is the day we lose.



Editor-in-Chief



That's exactly what Inland's technical chefs will do when its giant, new sintering plant is completed in June. A single day's mix—4300 tons of iron ore particles, 500 tons of crushed limestone, 250 tons of fine coke—will bake a cake of clinkers which can be fed directly into blast furnaces. Result—better, faster reduction of raw iron ore to pig iron, blast furnace production upped 10%—*more and more Inland steel to feed the hungry production lines of fast-expanding Mid-America manufacturing!*

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Transfer-Machine Standards

First building block standards for automation machines are about to be realized. According to reliable auto industry sources, standards on basic dimensions in four specific areas are expected to be ratified by special machine builders within a month. The working committee named during the January building-block meeting has completed its work. Results are going to individual builders for final okay.

Backward Saw for Laminates

A simple change in setup eliminates the stringers and chipping caused in normal sawing of nylon and paper laminates. All you have to do is mount the circular saw blade backward. It's recommended for sheet laminate 3/16 in. or less in thickness, and for thin-wall tubing with walls 1/32 in. and under.

Alloys Can Lighten Bridges

Bridge designers and engineers say they'd like to use more alloy steel. They believe expansion of use depends on getting more data from steel producers on fatigue and load factors, and revision of bridge specs for thinner web construction. They point out present specs make many bridges 75 pct dead load. The figure can run as high as 90 pct. Also, the lighter webs reduce construction costs and may actually provide better fatigue life.

Speed Rod Mill Roll Forming

A new method forms and redresses annular grooves or passes in rod mill rolls up to 75 pct faster than present methods, it's reported by a machine-tool builder. In addition the setup provides a higher quality roll as well as longer roll life since harder rolls are used.

Inspect With Fluoroscopy

To meet new challenges in the field of non-destructive testing, an aircraft builder develops fluoroscopy for the job. It's a direct-viewing method with many advantages in production

checking of stainless-steel honeycomb sandwich panels. Defective areas can be resolved and recorded photographically. As higher output tubes with smaller focal spots are produced and finer grain screens are developed, new uses will be forthcoming.

Direct Nuclear Conversion

A new technique is expected to cut by one-half the present cost of building power reactors. Called a plasma thermocouple, it eliminates boilers, turbines, gas condensers and dynamos. The new setup substitutes ionized cesium gas (plasma) for one of the metallic elements of a thermocouple. A research reactor could be in operation within two years.

Revise Blast Furnace Rates

Blast furnace men are said to be revising their estimates of the benefits from ore beneficiation and new operating techniques. At one time the target was a reduction in coking rates from 1800 lb per ton of iron to 1250 lb. The word now is that operators are shooting for a coking rate of 900 lb per ton of iron.

Now Mechanized Teaching

Courses given by machines are being offered to 250 students at one college. The student peers into two windows of a machine, reads a question projected from microfilm and writes his answer on a paper tape. When he moves a lever to uncover the correct answer, a clear plastic shield covers his answer. He can compare the two, but cannot change his answer. The setup is intended to strengthen ability for self-learning.

Seven-Stage Space Rocket

Scientists have started work on a huge seven-stage rocket which may take man to the moon within the next four years. Dubbed "Nova" the rocket would use three stages on the outward journey; one to slow it down for a moon landing, and three to return to earth. Each of the first two stages would develop 1.5 million lb of thrust. Height of first three stages alone will equal a 26-story building.



POP'S School of Sawing




At last you can tell what a hacksaw or band saw blade will do just by looking at it. You know you can expect outstanding performance and low cost—when you see a Nicholson trademark.

These are the things Nicholson trademarks have always meant. These are the reasons the Nicholson and Black Diamond names are respected and wanted.

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NICHOLSON METAL SEPARATING BLADES ARE AVAILABLE IN THESE TYPES

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Flexible High Speed Molybdenum	Standard Steel
All Hard Molybdenum	All Hard Standard
All Hard Tungsten	Special Shatterproof

POWER HACKSAW BLADES

Welded Edge Shatterproof	All Hard Molybdenum
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FILES • ROTARY BURS • HACKSAW AND BAND SAW BLADES • GROUND FLAT STOCK • INDUSTRIAL HAMMERS

LETTERS FROM READERS

Senatorial Salvo

Sir—I am not normally a “letter-to-the-editor-writer,” but Senator Douglas of Illinois has been getting under my hide more and more. And when I saw your story about his comments on government limousines (Battle of the Limousines, Apr. 2, p. 47) I decided to use you as my escape valve.

Douglas is trying to make a case for himself as an economizer while voting to spend billions whenever he gets a chance. He voted for the airport, housing, and depressed areas extravaganzas during this Congress. Then he turns around and bughunts on limousines, and minor waste by the Air Force on “junks.”

I don't recall hearing him complain about these things during the terms of Presidents Roosevelt and Truman. Do you?—J. P. Selvage, Selvage & Lee, New York.

Engine—Front or Rear?

Sir—Your article “Where Does the Engine Belong?” (Mar. 26, p. 117) was most interesting. Certain elements of the domestic automotive business and the press have been casting aspersions on rear-mounted engines ever since the Volkswagen, the Renault, and the Fiat have been selling in appreciable numbers in this country.

But comments of British engineers concerning safety must be taken with a grain of salt concerning which design “is safer” than another. There are formidable groups of German, French, and Italian engineers who can present equally “very definite opinions” in favor of rear-engined cars.

Your comments on understeer and oversteer characteristics are slanted and very incomplete. Porsche sports cars and racing cars with oversteer characteristics are world-renowned for their ability to go through a given curve faster and with more stability than practically

any other production or race-prepared automobile.

Naturally, I drive a Porsche—and an American-made car—and I personally prefer the “wrong-end” design with the “unsafe” swing axle to one with an engine “where it belongs” and that conventional rear axle design.—R. W. Leary, Leeds & Northrup Co., Phila.

■ Reader Leary's letter was written before a companion article (The Case for Rear Engine Cars) appeared in our April 2 issue.—Ed.

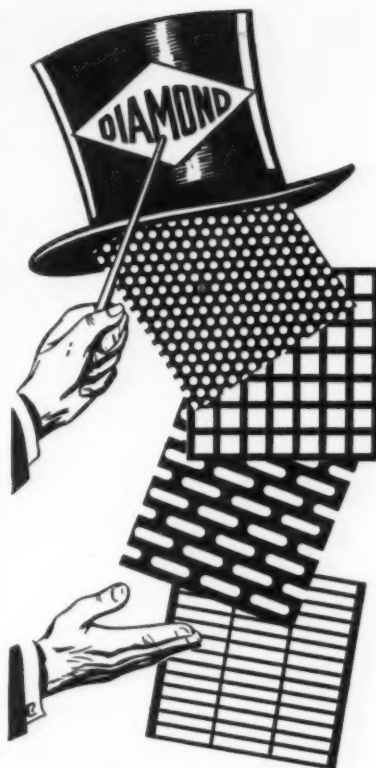
Crazy Talk

Sir—I applaud your recent editorial on economic controls. Since it parallels my thinking, but is expressed in better fashion than I could, I would appreciate a half dozen reprints so I may express my thinking to my legislators, both in Washington, D. C. and in Albany.

I believe there are more people who agree with the thoughts expressed than take the time to contact their representatives. I for one, particularly within recent months, take every opportunity to transmit my feelings to the legislators.—B. S. Gawlowicz, Ebasco Services, Inc., New York.



“We prefer married men to single. They're used to thinking quickly on their feet.”



Top-Hat Quality IN Perforated Metal

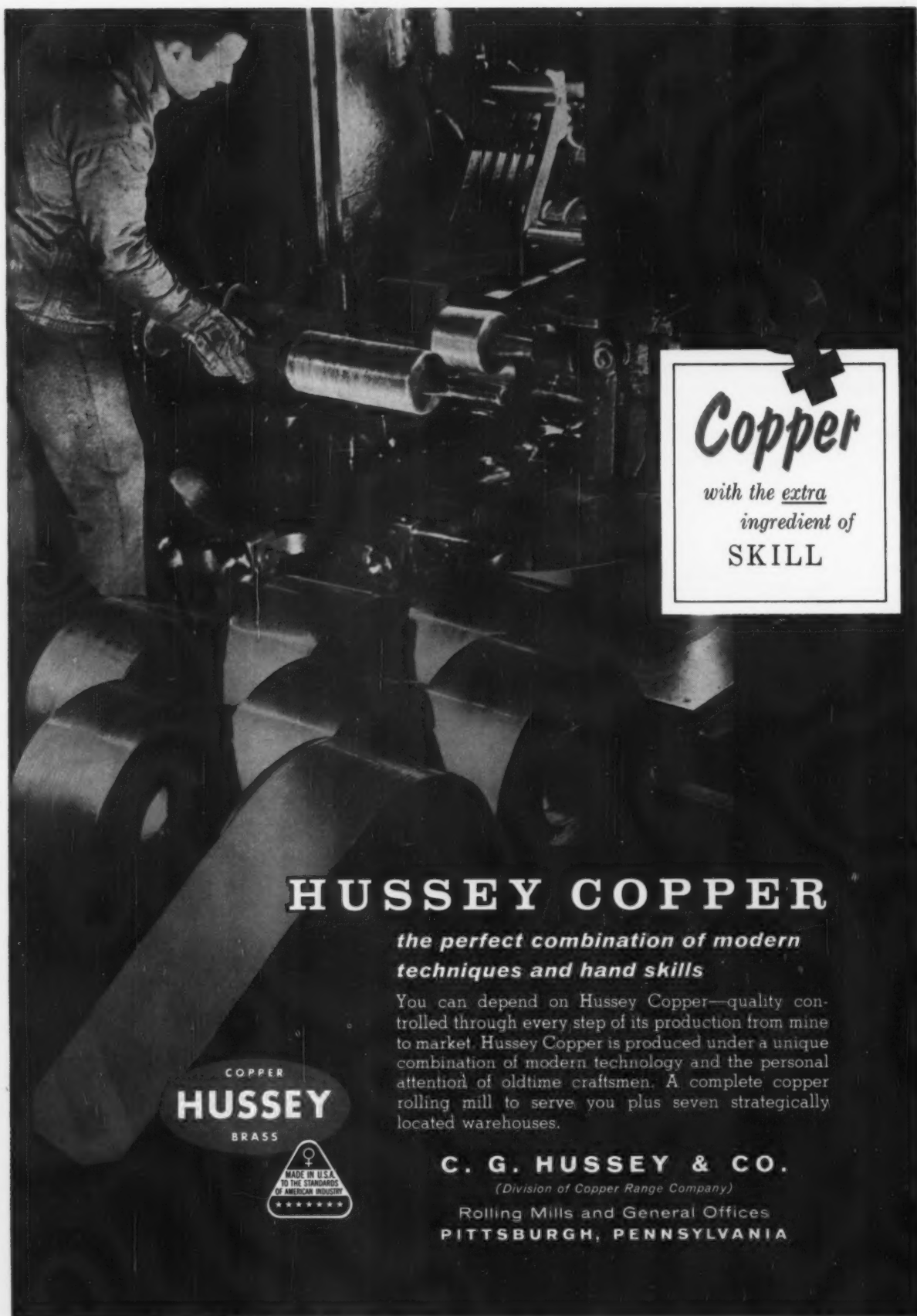
The popular Diamond Perforated-metal patterns shown above are only a few of the many illustrated and described in our 32-page Catalog No. 39. All of these standard patterns are available in a wide range of unit-opening sizes and we are always equally pleased to quote on original designs of any type or size.

Catalog 39 also illustrates and describes our high-quality lines of Ornamental Cane, Perforated-Metal Sheets for Acoustical installations and Heavy-Duty Architectural Grilles. Write, today, for a free copy.

Correspondence is especially invited regarding ANY requirement for perforated-metal panels or parts. We are equipped to fabricate special sections to any desired extent and welcome opportunities to make money-saving suggestions.

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FATIGUE CRACKS

Moving Day

How do you dismantle a 150-year-old steam engine and transport it from England to the U. S.?

These were the problems faced by the DoAll Company, Des Plaines, Ill., when it bought one of the first steam engines made by James Watt for the company's new Hall of Progress.

The Hall of Progress at Des Plaines will be opened to the public next month. It's an exhibit of historical machines, inventions, and discoveries of the Industrial Revolution assembled "to promote better public understanding of the forces which created our present way of life."

Wall in the Way—But back to our steam engine. To get it loose an entire plant wall was removed and then replaced. The factory manager reported, "Nearly all the trouble was due to the fact the engine was literally part of the building—and, in some cases, was probably holding it up."

Another problem: Making sure

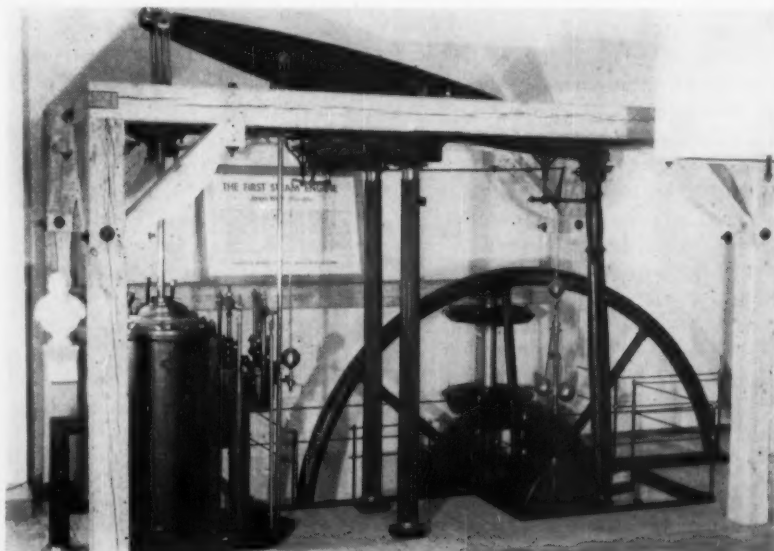
the engine could be reassembled exactly the way it stood in the mill. To insure this, DoAll made sketches and took photographs from various angles before and during dismantling operation.

Flywheel Cut Apart—The engine's 16-ft flywheel was cut into sections for shipment. The sections were then welded together when the engine was reassembled.

Although more than a century and a half old, the engine was still operating and in good condition when bought by DoAll.

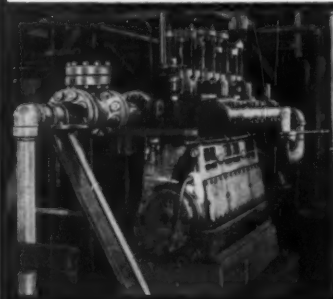
What Watt Did—Incidentally, did you know James Watt invented the term "horsepower?"

Watt's rotative engines replaced horses in turning textile and flour mill machinery. So Watt scientifically computed the amount of work the horses did. He found each horse exerted a force capable of lifting 33,000 pounds one foot per minute. Thereafter he rated his engines at "so many horses," for example, "20 horse" or "60 horse" engines.



WATT'S STEAM ENGINE: Before an original steam engine built by James Watt could be re-located at DoAll Company's Hall of Progress in Des Plaines, Ill., there were problems to be solved. (See story above.)

COMPLETE CENTRAL HYDRAULIC SYSTEMS FOR



die casting



extruding



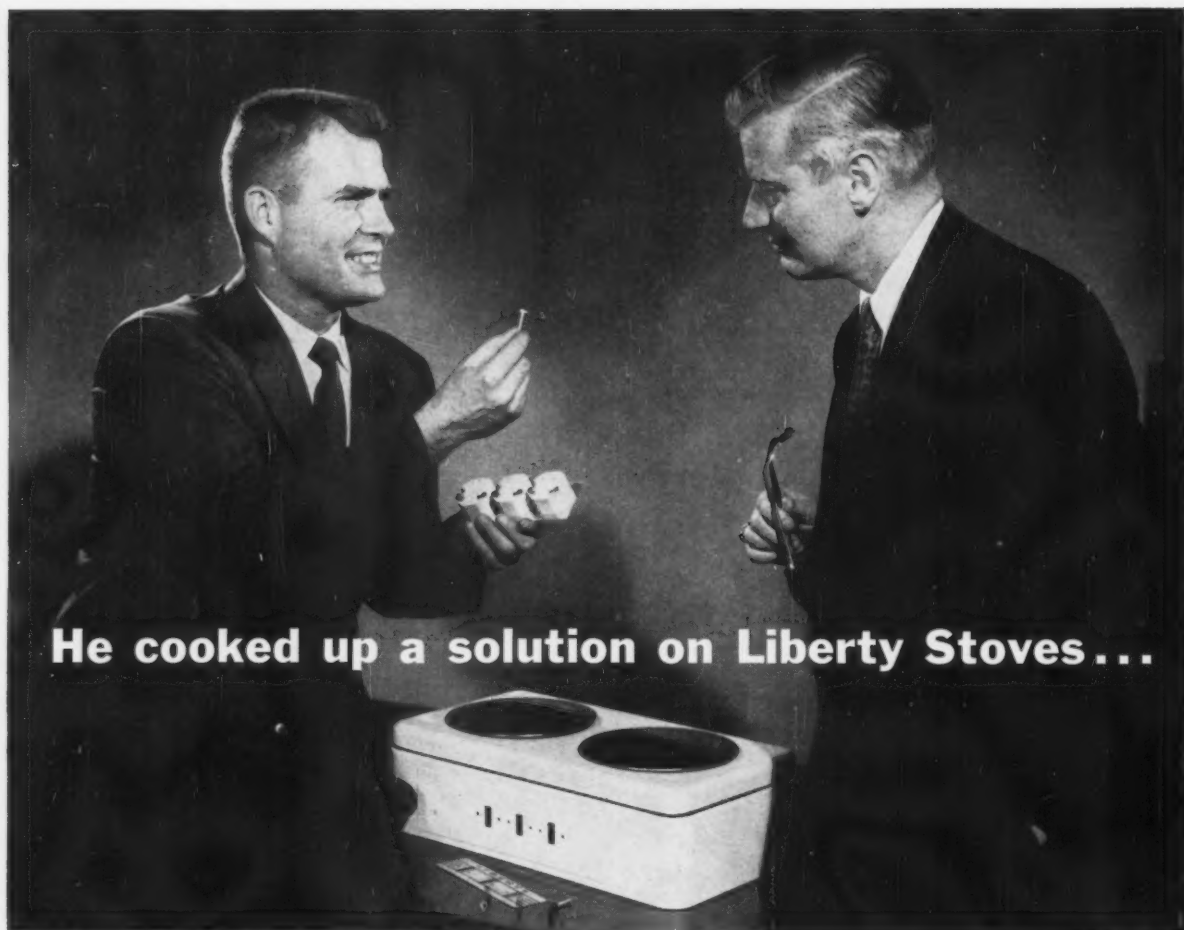
plastics molding

From Aldrich you get all the benefits of unified engineering plus the newest in pumping equipment. Aldrich Direct Flow Pumps to 2500 hp. Aldrich-Groff Controllable Capacity pumps to 125 hp. Pressures to meet your requirements. Write for data.

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He cooked up a solution on Liberty Stoves...

Riveting porcelain switches let 1 girl do the work of 6

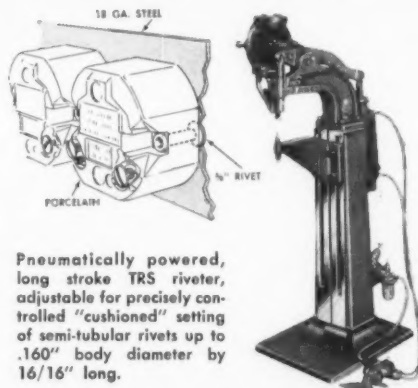
"You don't need to tie up six girls on slow, costly, nut-and-bolt assembly of porcelain switches to this mounting plate. You can do it on an automatic riveter... with one girl, low cost rivets, and no switch breakage..."

This was the TRS sales engineer's solution to the problem of Liberty Electric Co., Inc., Indianapolis, maker of fine electric table stoves. He had the rivet and machine know-how to work out the answer... an answer that saved five-sixths of the labor.

Let the TRS man look over your assemblies. You'll find that he has the viewpoint of a manufacturing engineer, and an unusual knack for making fastening simpler, faster, better.

Of course he will recommend TRS rivets. But he will give you sensible reasons why they are more reliable in essential qualities and uniformity. Ask to see the TRS Quality Control Album... one significant result of a five-year modernization of this pioneer company. Modernization of people, policies, production and service facilities. *You'll like to do business with the new TRS... we'll make sure of it.*

THE TRS MAN'S SOLUTION



Pneumatically powered, long stroke TRS riveter, adjustable for precisely controlled "cushioned" setting of semi-tubular rivets up to .160" body diameter by 16/16" long.

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See "Yellow Pages" for phone numbers.

If it's a Tubular Rivet TRS makes it... and Better



COMING EXHIBITS

Powder Metallurgy Show — Apr. 20-22, Sheraton-Cadillac Hotel, Detroit. (Metal Powder Industries Federation, 130 W. 42nd St., New York 36.)

Design Engineering Show — May 25-28, Convention Hall, Philadelphia. (Clapp & Poliak, Inc., 341 Madison Ave., New York 17.)

Material Handling Show—June 9-12, Public Auditorium, Cleveland. (Hanson & Shea, Inc., One Gateway Center, Pittsburgh 22.)

Industrial Finishing Show — June 15-19, Detroit Artillery Armory, Detroit. (Information: H. J. McAleer, 3171 Bellevue, Detroit 7, Mich.)

MEETINGS

APRIL

American Society of Tool Engineers —Annual meeting, Apr. 18-22, Schroeder Hotel, Milwaukee. Society headquarters, 10700 Puritan Ave., Detroit 38.

Metal Powder Industries Federation —Annual meeting, Apr. 20-22, Sheraton-Cadillac Hotel, Detroit. Federation headquarters, 130 W. 42nd St., New York 36.

American Society of Lubrication Engineers — Annual meeting and lubrication exhibit, Apr. 21-23, Hotel Statler, Buffalo, N. Y. Society headquarters, 84 E. Randolph St., Chicago.

Lead Industries Assn. — Annual meeting, Apr. 22-24, The Drake Hotel, Chicago. Association headquarters, 60 E. 42nd St., New York.

American Zinc Institute, Inc.—Annual meeting, Apr. 23-24, Drake Hotel, Chicago. Institute headquarters, 60 E. 42nd St., New York.

Wire Assn. — Regional meeting, Apr. 23-24, Statler Hotel, Boston. Association headquarters, 453 Main St., Stamford, Conn.

(Continued on P. 16)

gal-va-nize (gäl/və nīz), v.t. 1. to simulate by or as by a galvanic current. 2. to coat (metal, esp. iron or steel) with zinc.

WEBSTER

USAF PHOTO—Zincilate meets or exceeds military (USAF MIL-P-26915) and government (FHA-UM-24A) standards for galvanize



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With Zincilate, you can . . . galvanize any component, product or structure—regardless of its size or shape . . . galvanize anywhere—in your plant or at the installation . . . galvanize any time—before, during or after fabrication . . . galvanize on production lines or on maintenance work. You can even repair hot-dip galvanize without pre-treatment.

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HYDRAULIC Topping, HYDRAULIC
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Steering. 5 sizes: 1½, 2½, 5,
10 and 12½ ton capacities.
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EXHIBITS, MEETINGS

(Continued from P. 15)

Metal Treating Institute—Spring meeting, Apr. 23-25, Hollywood Beach Hotel, Hollywood, Fla. Institute headquarters, 271 North Ave., New Rochelle, N. Y.

The Association of American Battery Manufacturers—Spring convention, Apr. 23-25, Americana Hotel, Bal Harbour, Miami Beach, Fla. Association headquarters, 19 N. Harrison St., E. Orange, N. J.

Scientific Apparatus Makers Assn.—Annual meeting, Apr. 25-30, The Greenbrier Hotel, White Sulphur Springs, W. Va. Association headquarters, 20 N. Wacker Drive, Chicago 6, Ill.

The National Screw Machine Products Assn.—Annual meeting, Apr. 26-30, Roosevelt Hotel, New York. Association headquarters, 2860 E. 130th St., Cleveland 20.

Steel Boiler Institute, Inc.—Annual meeting, Apr. 27-28, Sheraton-Park Hotel, Washington, D. C. Institute headquarters, 1308 Land Title Bldg., Philadelphia.

Association of Iron & Steel Engineers—Spring conference, Apr. 27-29, Hotel Statler, Buffalo. Association headquarters, 1010 Empire Bldg., Pittsburgh.

National Machine Tool Builders' Assn.—Spring meeting, Apr. 30-May 1, Hotel Statler, Detroit. Association headquarters, 2071 E. 102nd St., Cleveland.

MAY

American Steel Warehouse Assn.—Annual meeting, May 3-6, Drake Hotel, Chicago. Association headquarters, 540 Terminal Tower, Cleveland.

Air-Conditioning & Refrigeration Institute—Annual meeting, May 3-6, The Homestead, Hot Springs, Va. Institute headquarters, 1346 Connecticut Ave., N. W., Washington 6, D. C.

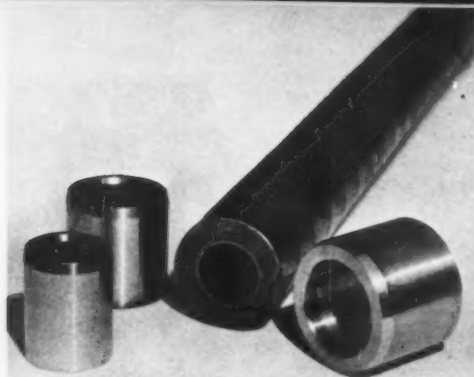
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out of today's
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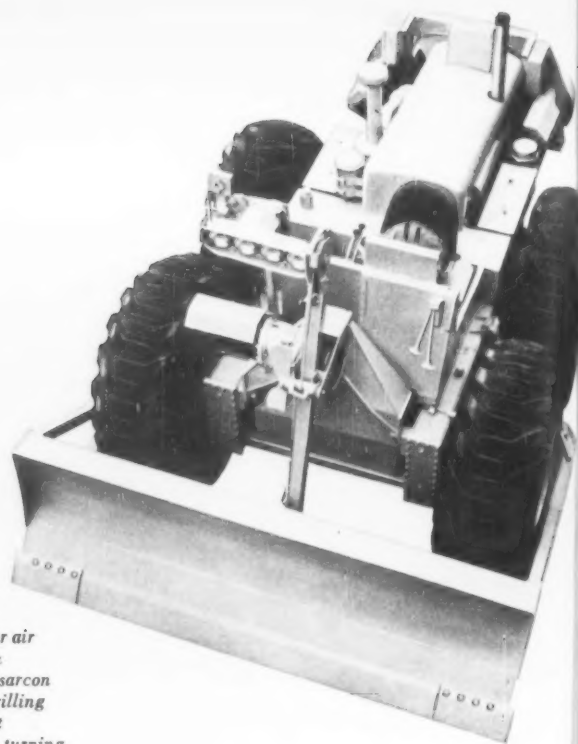
*is through
the use of
more efficient
materials which
cost less to
machine and
fabricate, yet
produce a
better product..."*
*i. e. Asarcon[®]
Continuous-
Cast Bronze*

ASARCON

SEE NEXT PAGE



Motor-drive clutch-ratchet shaft bearings in various Remington Rand calculating machines are continuous-cast from Asarcon 773 Bearing Bronze. These bearings test out 33% higher in impact strength to their sand-cast predecessors!



Cushion collars for air cylinders cut from continuous-cast Asarcon tubes eliminate drilling operation, also cut costs of finishing, turning and grinding collars to very close tolerances.

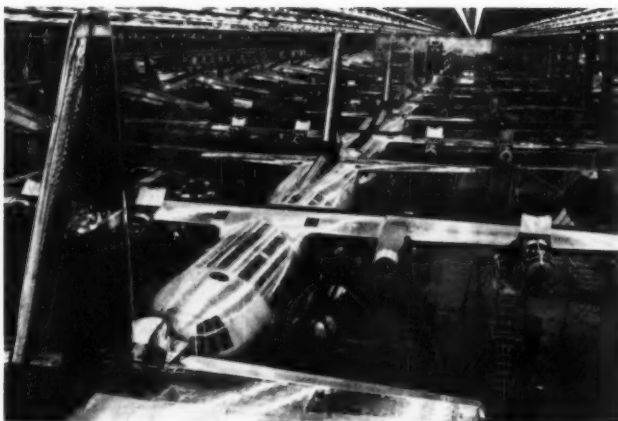
Design for full production efficiency CON



Easy machining and longer wear governed the choice of Asarcon bronze for the worm gears and guide bushings on this power belt sander.

Asarcon
in heavy
extends s

Asarcon bronze, as power transmission bearings in heavy duty equipment, improves performance, extends service life.



Asarcon bronze bearings act as seal against 3000 pounds of oil pressure in control assembly in Lockheed's C-130. These bearings save space, weight. Their great uniformity gives low friction, high load capacity.

CONTINUOUS-CAST BRONZE CASTINGS



Among the continuous-cast shapes available in Asarcon alloys are those suitable for valve guides, bushings, thrust washers, retainers, gears, brake discs, nozzles, seals, sleeves, plugs.

Lower material costs, faster production, better products. Certainly a powerful set of reasons for evaluating Asarco's unique process of casting shapes in continuous lengths. The alloys produced by continuous casting are in accord with SAE, ASTM, and government specifications but their performance is demonstrably superior to similar alloys cast other ways. So superior in hardness, tensile, yield, and impact strength, that you may be able to substitute an Asarcon bronze for a high-cost aluminum—or manganese bronze. You get the shape you need in the exact lengths you need, with minimum clean-up necessary, machinable on high speed machines.

Before you design or produce a copper base part, investigate the economy and efficiency of continuous-casting. From a simple sketch, Asarco can tell you whether or not your part can be economically made from a continuous-cast alloy. Call in your nearby Asarco representative or write to Continuous-Cast Products Department, American Smelting and Refining Company, Barber, N. J. West Coast Distributor: Kingwell Bros., Ltd., 457 Minna St., San Francisco. In Canada: Federated Metals Canada, Ltd., Toronto and Montreal.

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5. Less down-time. The better, more uniform properties of Asarcon 773 assure longer life of important machine parts and few breakdowns.

Order Asarcon 773 from stock in 260 sizes, solids and tubes, any length up to 105", from a national network of distributors. Write for address of nearest stock point and complete data, to Continuous-Cast Products Department, American Smelting and Refining Company, Barber, N. J. West Coast Distributor: Kingwell Bros., Ltd., 457 Minna St., San Francisco. In Canada: Federated Metals Canada, Ltd., Toronto and Montreal.

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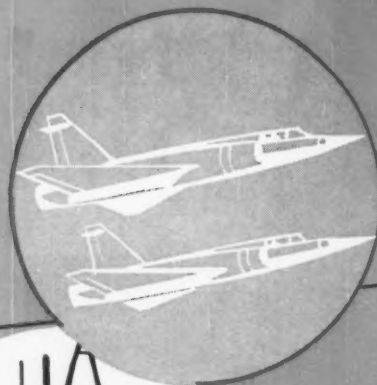
are used for Textile Machine Parts such as sinkers, needles, etc. • Band Saws (metal, wood and butcher) • Camera Shutters • Clock and Watch Springs • Compressor Valves • Doctor Blades • Feeler Gauges • Knives such as cigarette knives, surgical, etc. • Razor Blades • Shock Absorbers • A Wide Variety of Springs • Trowels • Reeds: Vibrator, Textile, etc., • Piston Ring Segment and Expanders • and many other applications.

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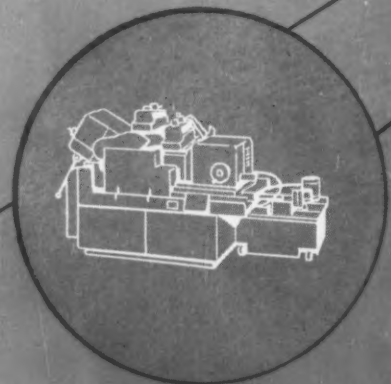
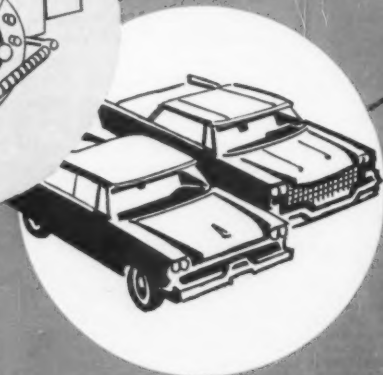
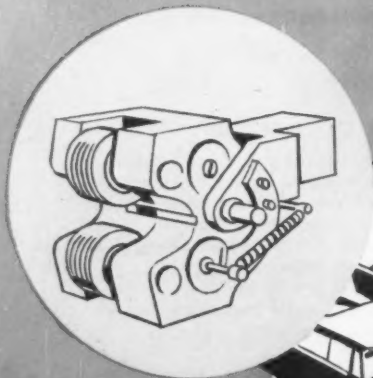


SS-105



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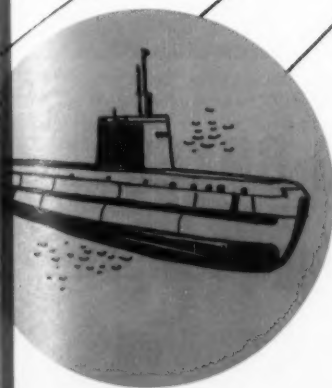




Through the advance thinking of LANDIS research and development new threading equipment is constantly being introduced . . . improved to do the job faster, easier and at less cost.

LANDIS has within the last several years produced many new developments . . . the LANROLL Thread Rolling Attachment . . . the LANHYROL Thread Rolling Machine . . . the LANDMACO C-Type Threading Machines . . . Taper Thread Rolling with the LANROLL Attachment . . . the Automatic Coupling Tapping Machine . . . Thread Rolling Heads . . . and even now new products are on the drawing boards and the testing floors. Recently released was our new production type high speed LAN-NU-ROL Thread Rolling Machine. Each of these machines and tools was designed to improve a specific threading operation. For example, new sizes and types of Die Heads and Collapsible Taps now available are suitable for many jobs that in the past could not be threaded by this equipment.

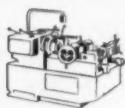
These new additions to our line emphasize our policy to continue product expansion whenever a need exists. Today, we offer the most extensive line of threading equipment available anywhere. Perhaps one of your threading jobs could be done more efficiently with a modern machine or tool developed from our half-century experience in a single field—THREADING. For detailed information, please send specifications and describe type of operation.



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Threading Machines



Die Heads—Rotary & Stationary



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Centerless Thread Grinding Machines



Thread Rolling Tools



Thread Rolling Machines



REPUBLIC ROLL-OVER TYPE SKID BOXES

speed up truck shipments at Jernberg Forgings Company

Saving time, money, and storage space! The Jernberg Forgings Company, Chicago, Illinois, is another company that has gone to Republic Skid Boxes adapted for roll-over and crane handling.

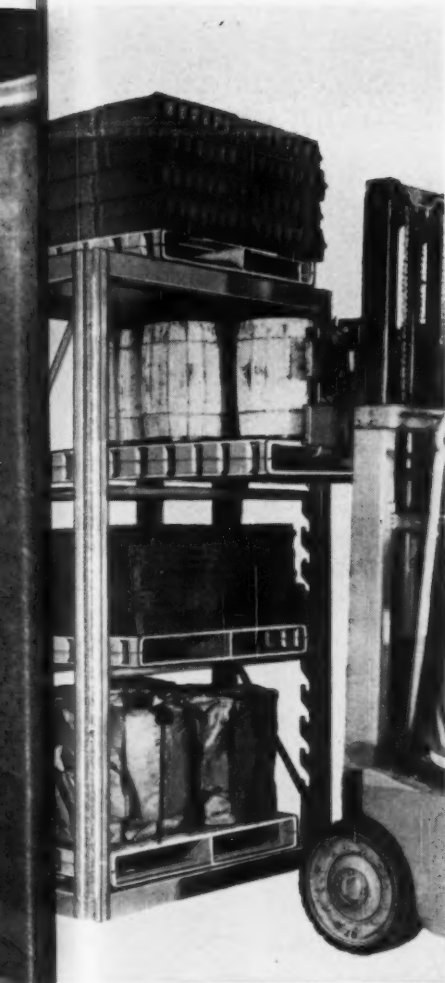
Jernberg, a major producer of automotive transmission parts, uses 200 such boxes for storage and subsequent loading of finished forgings into trucks for shipment. They've found that one man now loads a truck in less time than was required by using previous methods.

Another 200 boxes— $\frac{3}{4}$ standard size—are used for collection and storage of 3,200-pound loads of cold-sheared forging billets. Despite the extreme weight, Jernberg stacks the boxes high, reducing storage

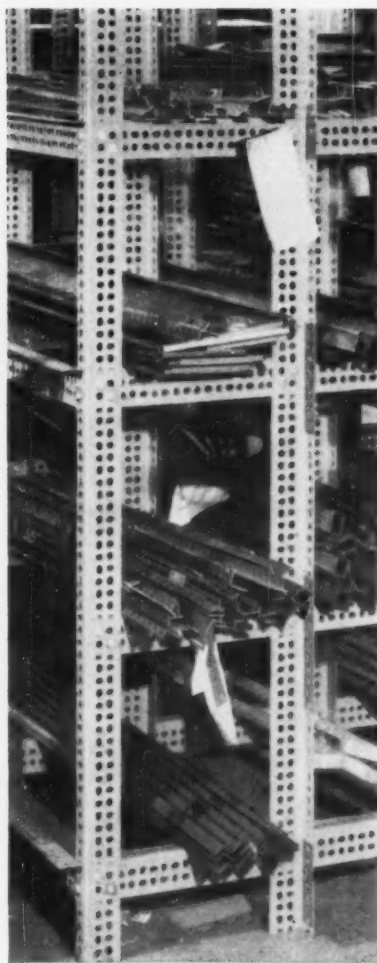
space requirements. This helps save time, too.

Stacking does not damage the boxes. Rugged, corrugated construction and heavy-duty stacking brackets permit tiering to any practical height... assure long, efficient service at lowest overall cost. In addition, four-way fork channels simplify handling in restricted space. Smooth channel around the top eliminates sharp edges.

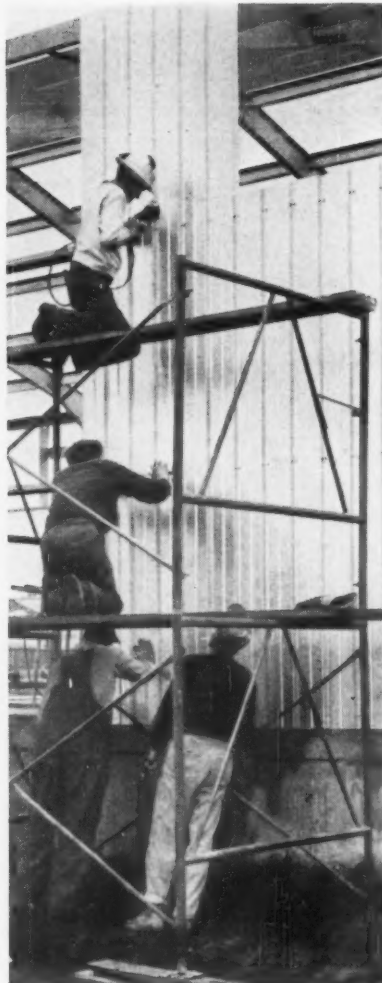
Like the Jernberg Forgings Company, you'll find that the materials handling engineers of Republic's Berger Division can help you save time, money, and storage space in your plant. Let them work with you in solving your materials handling problems. Call your Republic representative or write direct.



REPUBLIC STEEL PALLET RACKS save space and simplify palletizing and stacking of bulky, uneven, odd-lot and fragile materials. Tubular steel supports adjust every six inches to handle palletized material of any height. Two-way entry permits loading and unloading from either side. Select single pallets from any level without restacking. Write for complete description, specifications, and quotations. Or, have a Materials Handling Engineer call.



REPUBLIC METAL LUMBER® saves time, space, and money. Precision engineered system of short slots placed to allow $\frac{3}{4}$ " vertical and horizontal adjustment, offers unlimited applications. Simply measure, cut, and assemble. Delivered in bundles of 10 angles, .080 gage or .104 gage, 10- or 12-foot lengths, bolts and nuts included. Stores in space of one 2" x 4" piece of lumber. Bonderized to resist rust. Baked enamel finish. Mail coupon for idea-packed catalog.



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REPUBLIC STEEL

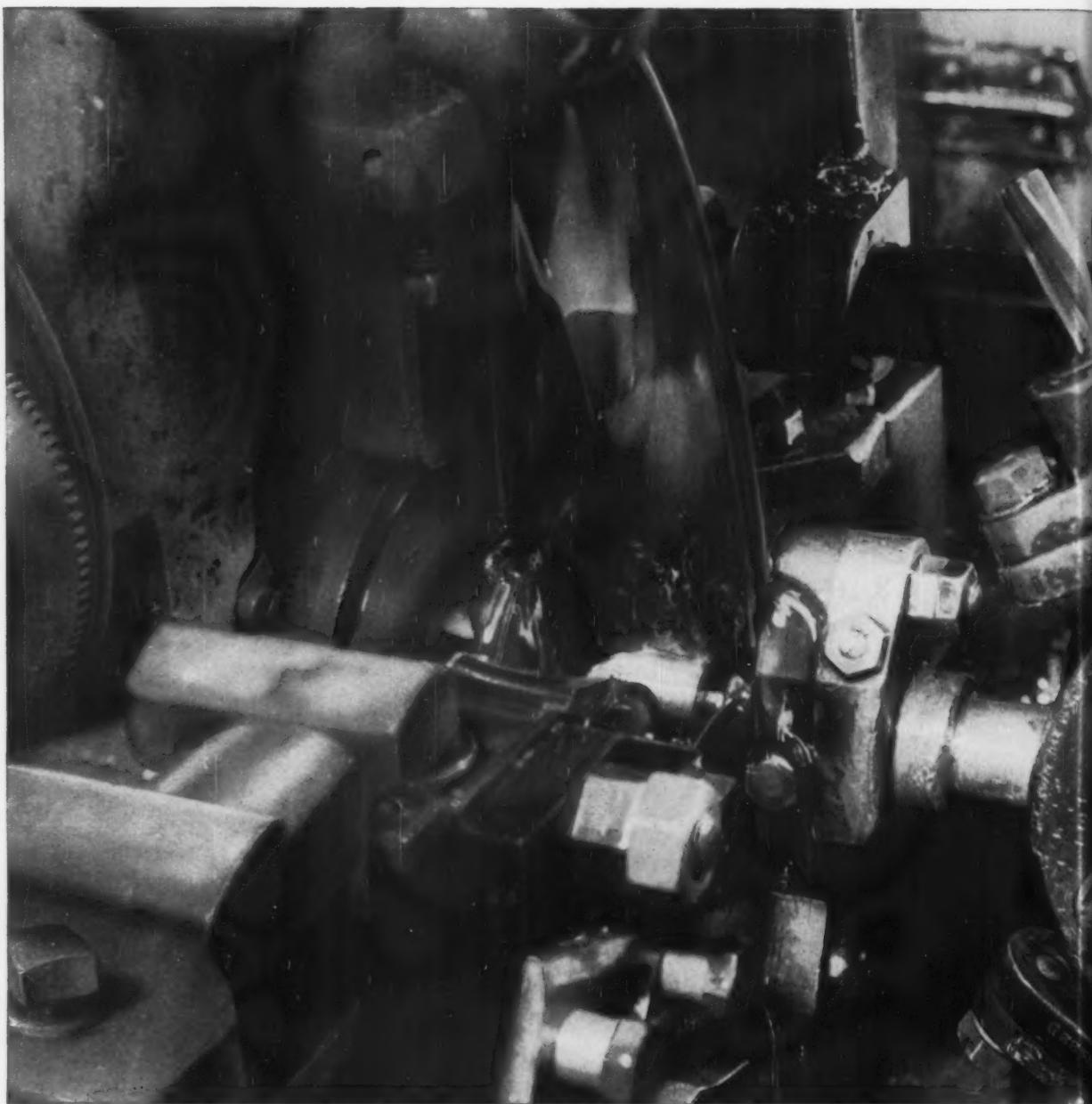


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Gold Micrometer winner describes Gulfcut 45B as "the **GULF MAKES THINGS**

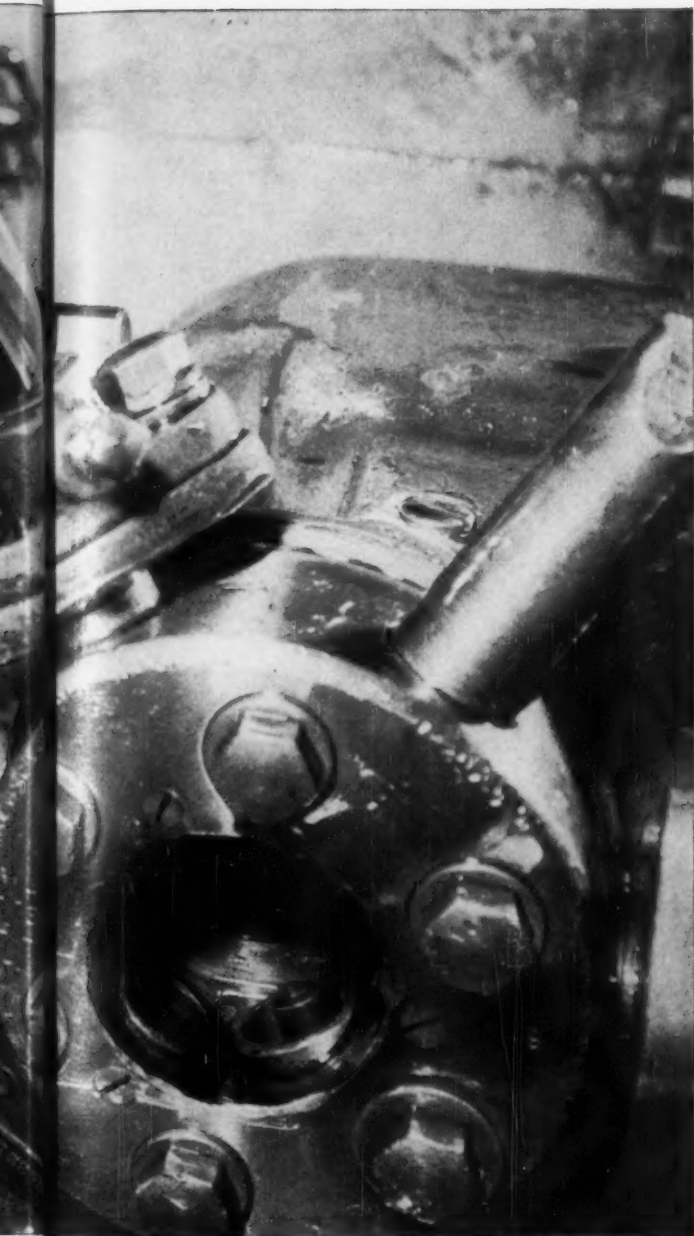
In 1954, the National Screw Machine Products Association awarded the Gold Micrometer to Mr. Emil Johnson, for 40 years of distinguished service to the industry. Mr. Johnson is Vice-President and Superintendent of Connecticut Manufacturing Company, in Waterbury, Connecticut.

Now, with over 44 years of experience with screw machines and cutting oils, Mr. Johnson describes Gulfcut 45B as "the best cutting oil we have ever used for those tough jobs."

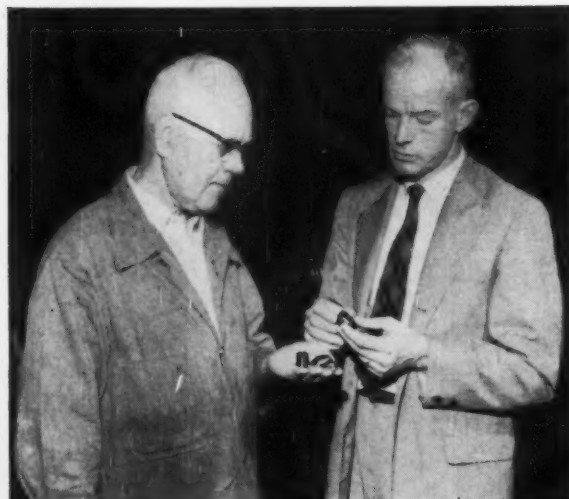
Connecticut Manufacturing produces precision parts in all metals for the automotive, electrical, firearms, and toy industries. They have a well-balanced shop equipped with automatic screw machines, cold headers, slotters, knurlers and thread rollers.

To prove his point on the superiority of Gulfcut 45B, Mr. Johnson selected a job in the shop involving the machining of a flush rod, part of a valve assembly made by a well-known plumbing company.

"On this job," he said, "the customer specified heavy



Precision production of these valve assembly flush rods, at Connecticut Manufacturing Company, rolls in high gear with Gulfcut 45B as the coolant-lubricant. Piece is machined from $\frac{1}{4}$ -inch stock of tough monel metal.



Mr. Emil Johnson, left, winner of Gold Micrometer award, shows finished pieces to Peter Eaton, Gulf Sales Engineer. Mr. Johnson uses Gulfcut 45B for all the tough machining jobs at Connecticut Manufacturing Company.

best cutting oil for the tough jobs”...

RUN BETTER!

draft and strain-tempered monel metal. Monel is tougher to cut than most metals. But with a workhorse cutting oil like Gulfcut 45B, we can hold to extremely close tolerances, provide good finish, and do it at higher speeds with less friction. We use Gulfcut 45B on all our tough jobs.”

See how Gulf makes things run better. Whatever type of machining you do, there's a shop-tested Gulfcut cutting oil to meet your needs. Call a Gulf Sales Engineer at your nearest Gulf office, or mail the coupon.

GULF OIL CORPORATION
Dept. DM, Gulf Bldg., Pittsburgh 30, Pa.

Send me more information on:

- ☐ Gulfcut "Regular" Cutting Oils.
- ☐ Gulfcut Heavy Duty Soluble Oils.

Name

Title

Company

Address

City Zone State

IA-0108





**Iron
& Steel
Sections
from
Stock**

Illustrated above are only a few of the many different sections in the standard range held. In point of fact, almost any practicable shape can be supplied on request.

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Write to Overseas Trade Dept. I. A.

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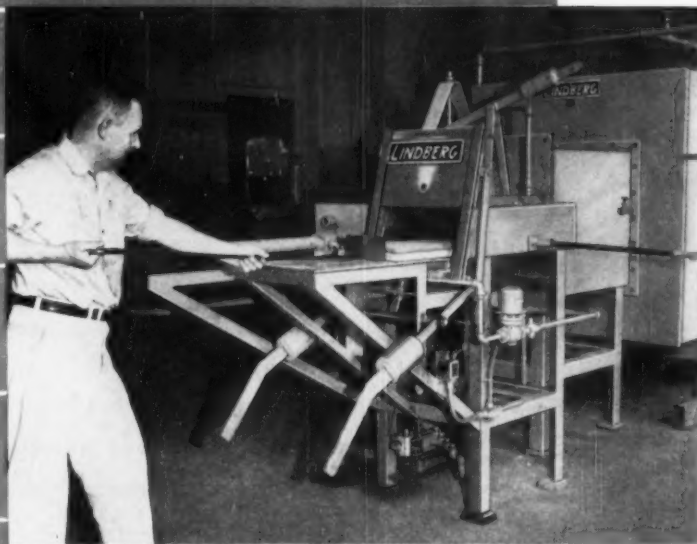
Have you received your current copy of The Albion Machinery Catalogue? If not, write for one today. This catalogue contains a comprehensive stock list of all new and secondhand Plant and Machinery, including Machine Tools, Contractors' Plant, Generating Sets and Pumps. It is regularly brought completely up to date and reprinted.

GPEJA

If your production needs call for Sintering call on Lindberg for just the right Furnace

As it does in all types
of industrial heating equipment;
Lindberg provides a complete line
of sintering and brazing furnaces.

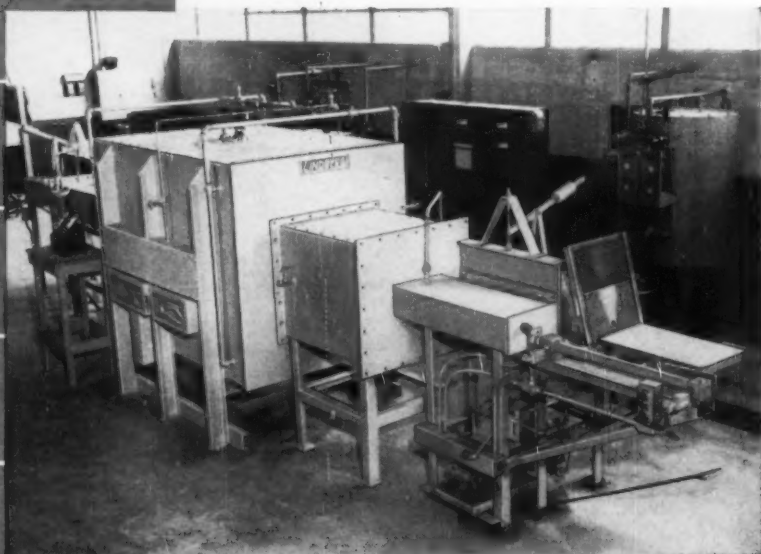
Here is one of our latest:



A new Lindberg development, this Molybdenum Element Atmosphere Pusher Furnace is designed with high temperature refractories suitable for low dew point without need for a muffle. It is now being used for sintering stainless steel compacts in hydrogen or dissociated ammonia. Ammonia dissociator and control panels are shown at the right of the furnace below. In this installation hydrogen supply cylinders are located outside the building. Furnace provides side loading and discharge ports with purging chambers. Work trays, ceramic slabs or molybdenum boats, move through the furnace by hydraulic pusher. If you have a sintering or brazing problem why not talk it over with Lindberg. Just get in touch with your nearest Lindberg Field Representative or write us direct. Lindberg Engineering Company, 2452 West Hubbard Street, Chicago 12, Illinois.

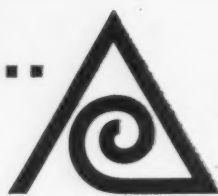
Type MOP-1267-AWC Molybdenum
Element Atmosphere Pusher Fur-
nace. Maximum Temperature 3000° F.
60 KW input. 12' wide, 30' long,
7' high. 60" cooling chamber, 30"
long preheat chamber.

LOOK UP LINDBERG, BOOTH 2,
at METAL POWDER SHOW IN
PHILADELPHIA

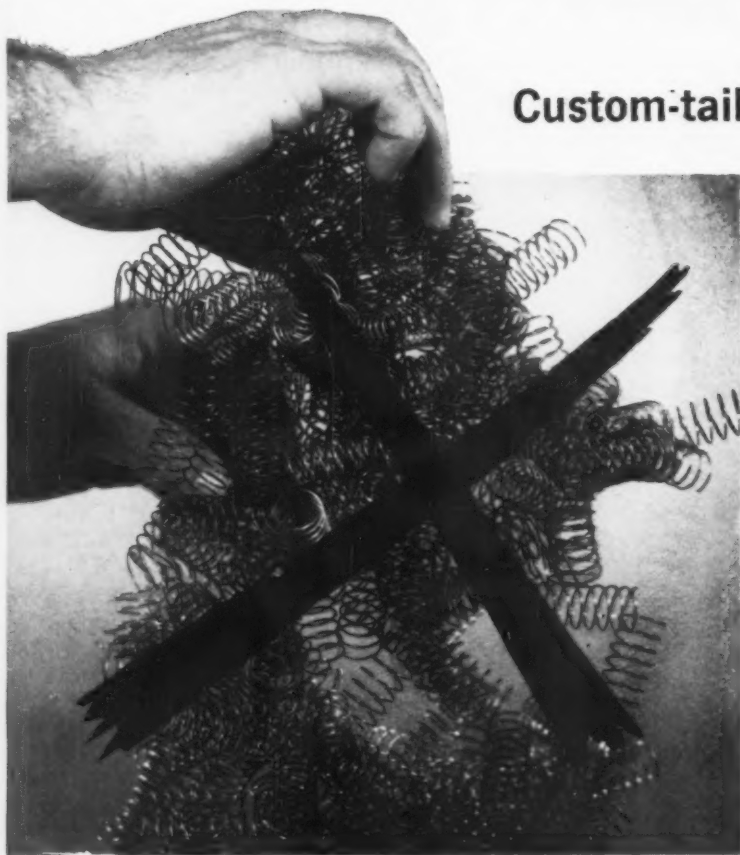


heat for industry

NEW...

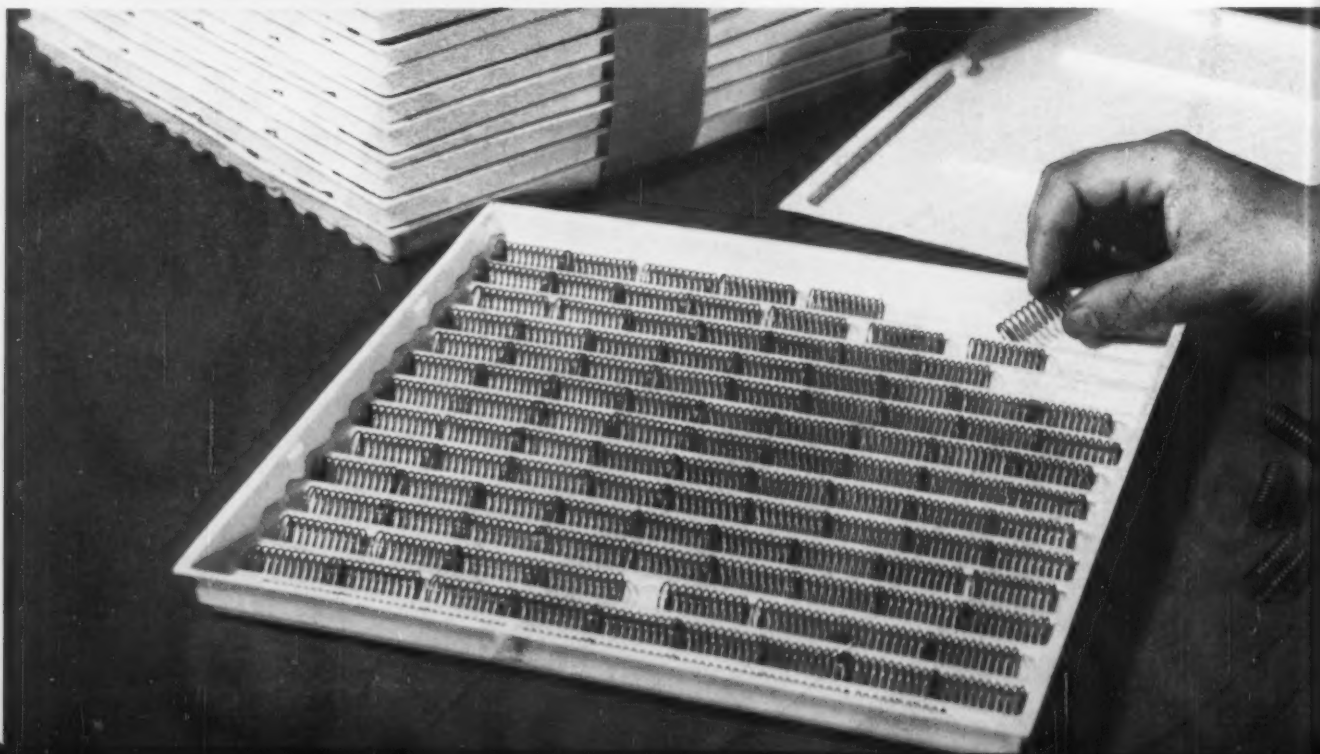


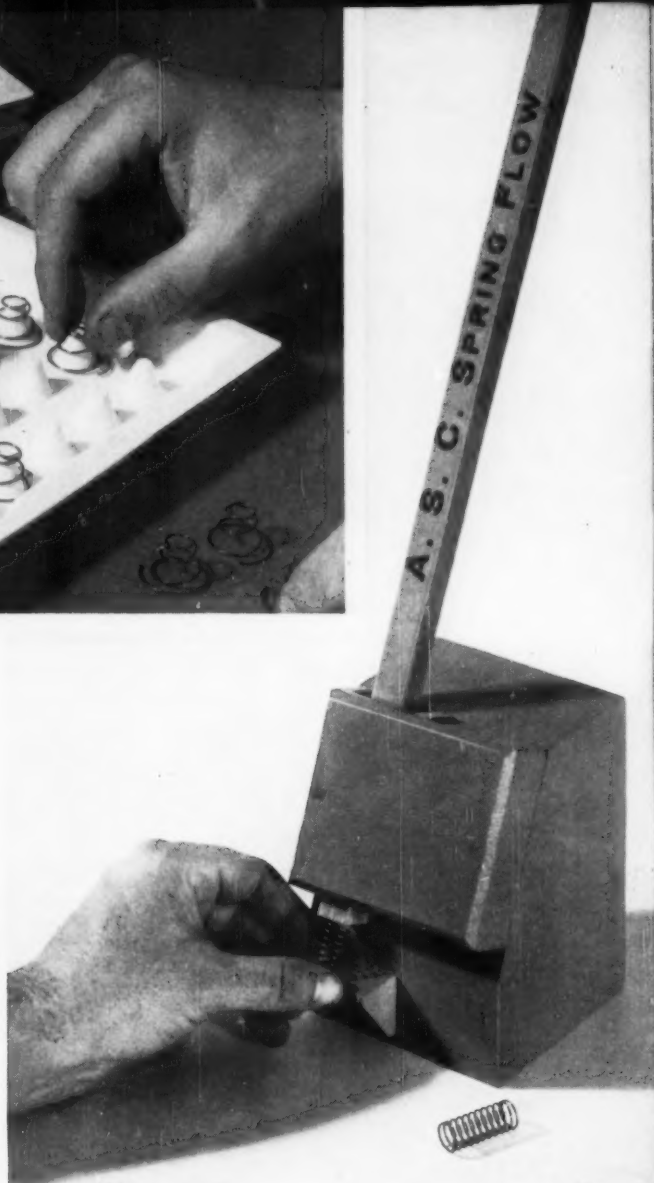
Spring Flow[®]



**Custom-tailored packaging of springs
that cuts costs and
speeds operations
in your plant**

Spring Flow is a systematic approach to the problems of handling and storage of springs, wire forms, small stampings, in customer plants. It overcomes time-wasting tangling, and the distortion that often results from tangling. It can be engineered for specific applications to expedite hand or automatic assembly.





Spring Flow lowers handling and assembly costs — eliminates distortion — protects finish

Spring Flow makes use of a variety of modern materials, dispensers, containers. The extent to which it may be applied depends on the complexity of each individual part and handling requirements. The cost of Spring Flow is frequently offset by resulting savings

The potential benefits of Spring Flow almost defy imagination. Ask for a Spring Flow proposal for your springs or other fabricated-metal products. Or find out more about this exclusive service by writing for the new booklet—"Spring Flow."

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PROJECT ALERT AT WORK FOR YOU



FIRST: Udylite introduced its plating barrel reconditioning and replacement plan. It has worked and is working, just as promised, for the many customers who have taken advantage of this service.

SECOND: Udylite offered an unmatched service for modernizing old rectifiers to give them the benefit of the latest high efficiency rectifier developments.

THIRD: Now, Udylite offers a *no charge* technical service for the inspection of your Udylite Full Automatic machines and the recommendation of what is needed to put them in top operating conditions.

THE PLAN AND THE PROMISE:

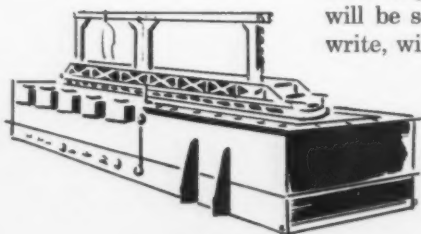
Your Udylite representative will call on you and offer this special service:

1. A factory-trained service man will call at your plant, at your convenience, to determine if your machines need service and/or parts.
2. If they are needed, he will give you, *at that time*, a quotation at the special low prices established for this Project Alert program.
3. On your acceptance of the quotation, parts will be shipped promptly from a special department at Udylite. When they arrive at your plant, the Udylite service man will return and supervise your people in their installation.

THE ADVANTAGES:

1. Complete machine inspection without charge to you.
2. Immediate and complete quotation, if work or parts are needed.
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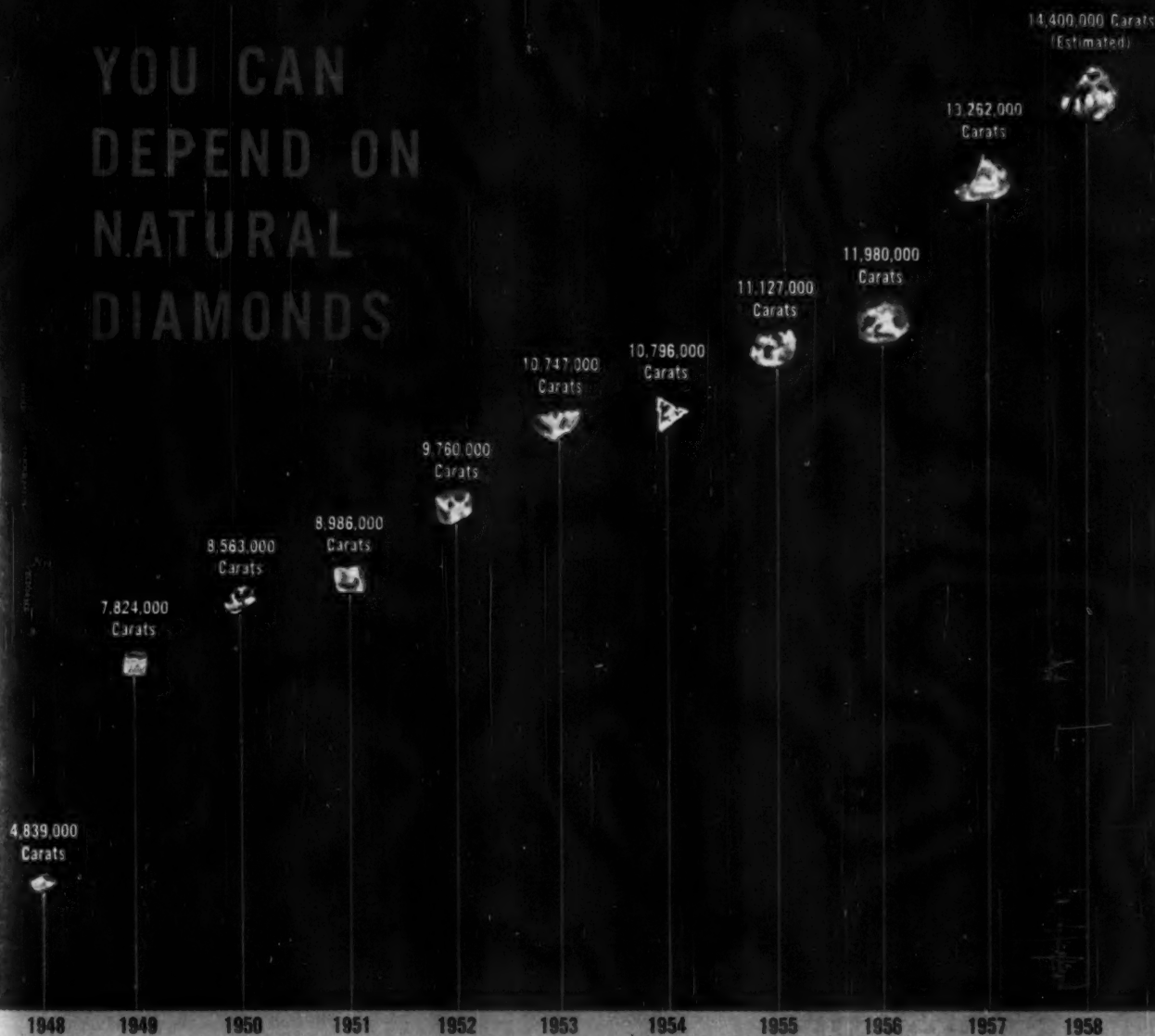
All three Project Alert plans are working. And all their advantages are yours for the asking. Your Udylite man will be seeing you soon. But if you need prior service, write, wire or call us *today*.



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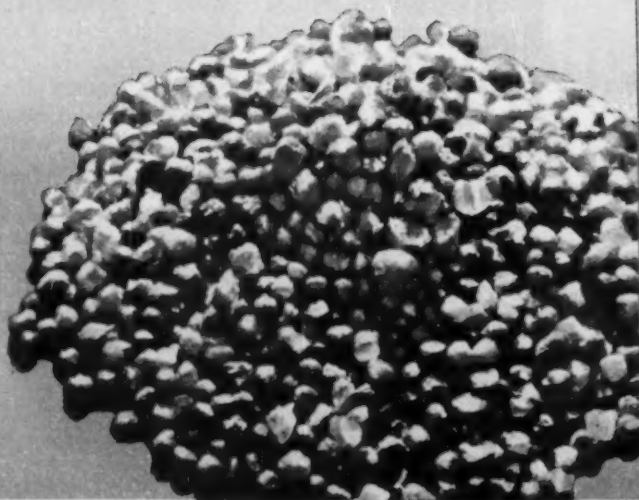


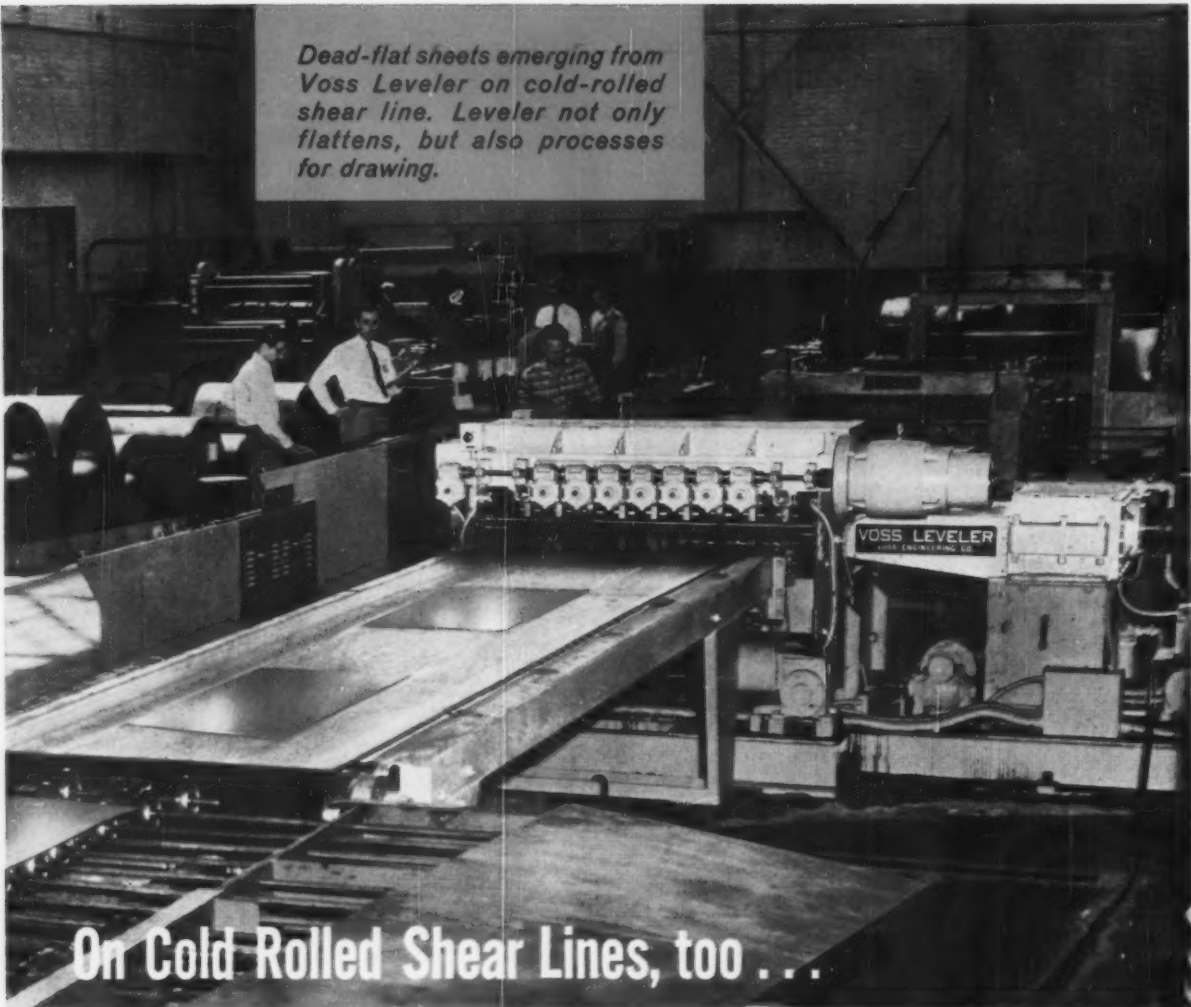
Boart production rises 197% in 10 years

Since 1948 production of crushing boart has risen 197 per cent. This means that there are ample supplies of natural diamond mesh for all the needs of American industry.



INDUSTRIAL DISTRIBUTORS (SALES), LTD.





Dead-flat sheets emerging from Voss Leveler on cold-rolled shear line. Leveler not only flattens, but also processes for drawing.

On Cold Rolled Shear Lines, too . . .


VOSS LEVELERS EQUAL OR EXCEED STRETCHER-LEVEL FLATNESS

Voss Inverted Roller Levelers are giving the same high performance on cold-rolled steel as they do on galvanized and hot-rolled products. One large producer reports that sheets from 85% of a light-gauge cold-rolled coil are leveled to stretcher-level flatness. Furthermore, this same operator has reduced re-rolling by 25%.

Another example: A maker of wall panels eliminates time-consuming inspection and sorting of individual sheets for flatness. By leveling them with a Voss, he automatically assures panel flat sheets

without further checking.

User after user tells of increased quality and lowered costs resulting from Voss Roller Levelers. Voss-patented exclusive design features assure extreme flexibility of application and precise area control on any section of a sheet or coil. Whatever your application—galvanized, hot or cold-rolled, strip, coils, sheets or plate, ferrous or non-ferrous—Voss has a quality-making, profit-making story for you. Write today for detailed information and a list of users.



Voss **ENGINEERING CO.**

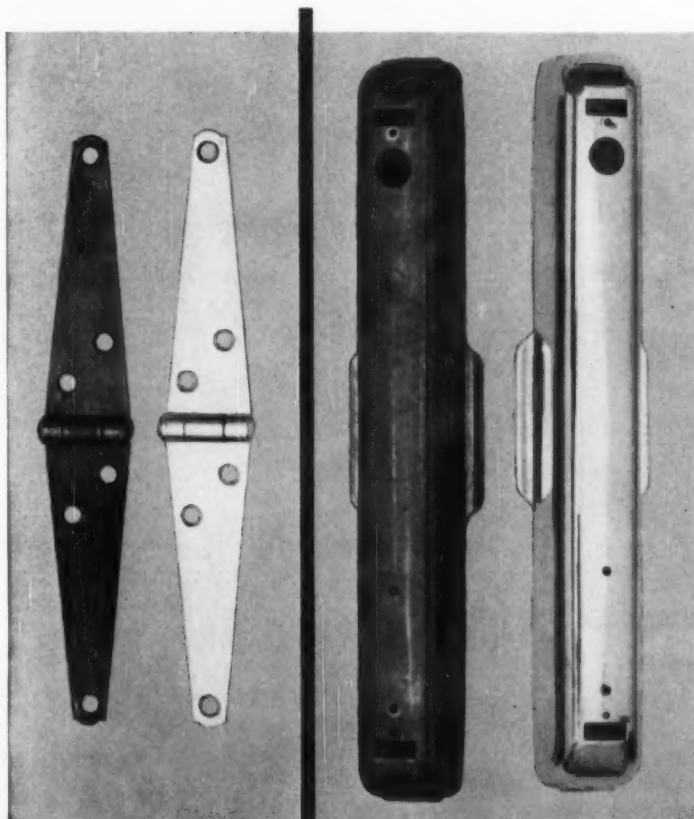
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Shelf appeal can be increased for only 3¢

Finishing costs reduced to 12¢

If It Looks Good...It Sells Better



High class look for 4¢

Fluorescent lamp reflector finishing cost cut 62%

If you're looking for a way to increase the sales appeal of your products by adding a quality appearance at low cost, you should investigate vacuum coating.

While this modern process is not a cure-all, most likely you'll find it will add new life to the items you manufacture — and may cut your costs spectacularly, too! Brilliant, eye-catching, metallic finishes, in a wide range of colors, can be applied on plastics, metals, wood, glass, paper, fabrics and many other materials. Today's vacuum coatings are brighter than buffed and polished electroplating, cost less, and in some applications stand up better.

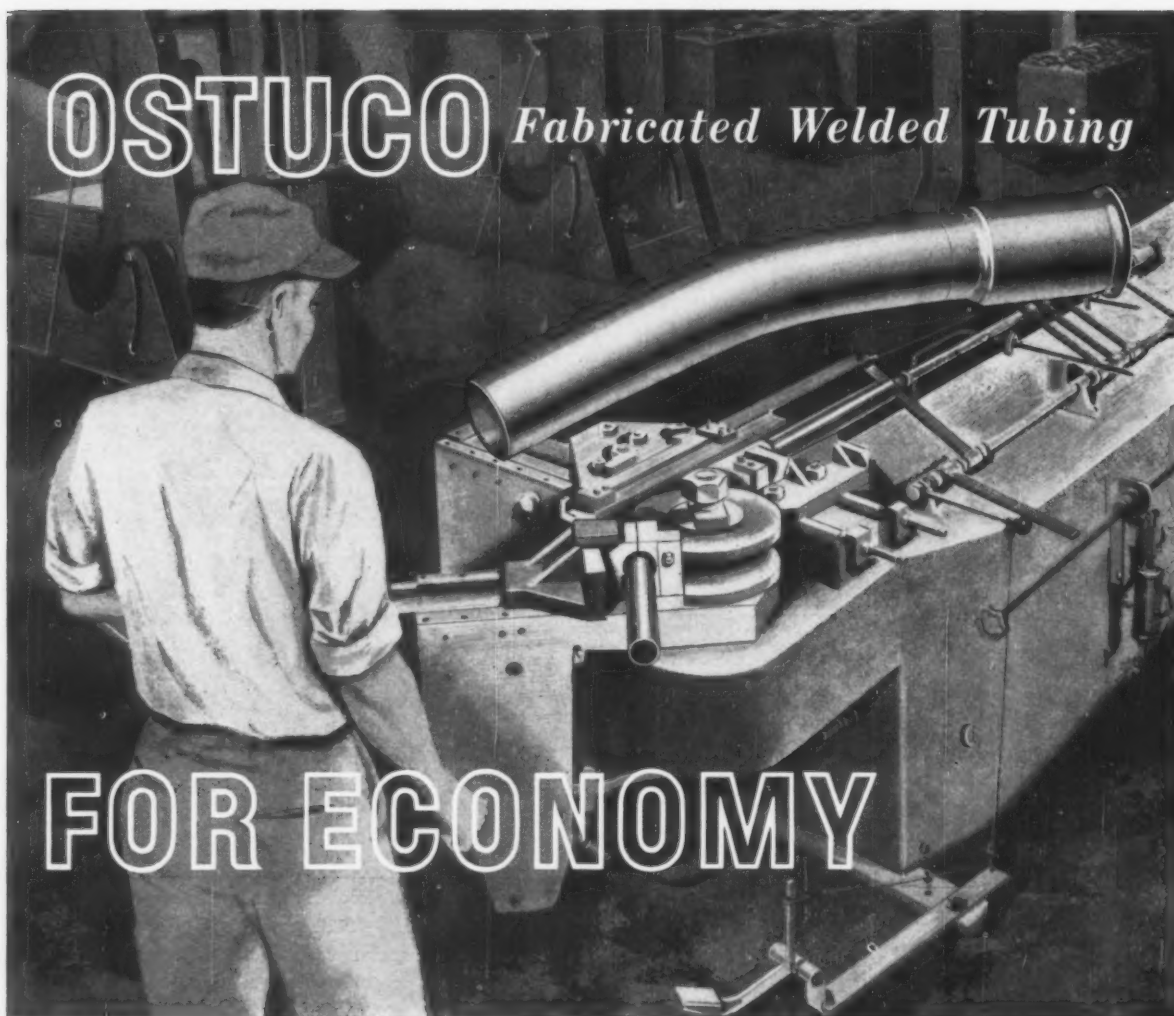
You don't have to take chances, either. Send us a sample of your product and give us details about its use. We'll tell you whether your application is a good one, show you how your product will look, and estimate your costs. Then, if you want, we'll supply a complete installation, guarantee its output, show you how to run it efficiently, and even train your operators. Write us today!



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Vacuum Cleaner Manufacturer Specifies



Bending vacuum cleaner wand. A variety of fabricating operations also is performed on Ohio Special Quality Seamless Tubing.

“Value analysis showed it would be more economical to buy than produce fabricated welded tubing parts for our new cleaner. What’s more, we could avoid additional capital investment in equipment.

“So we added Ohio Seamless to our production line. They have the equipment and facilities to meet our design requirements and to hold to our stepped-

up schedules. And we don’t pay shipping costs on scrap — just on finished parts . . .

Let Ohio Seamless translate your designs into finished parts . . . conserve your capital . . . cut your production and shipping costs. Contact your Ohio Seamless representative, listed in the Yellow Pages, or the mill at *Shelby, Ohio — Birthplace of the Seamless Steel Tube Industry in America.*

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Design Engineering Show
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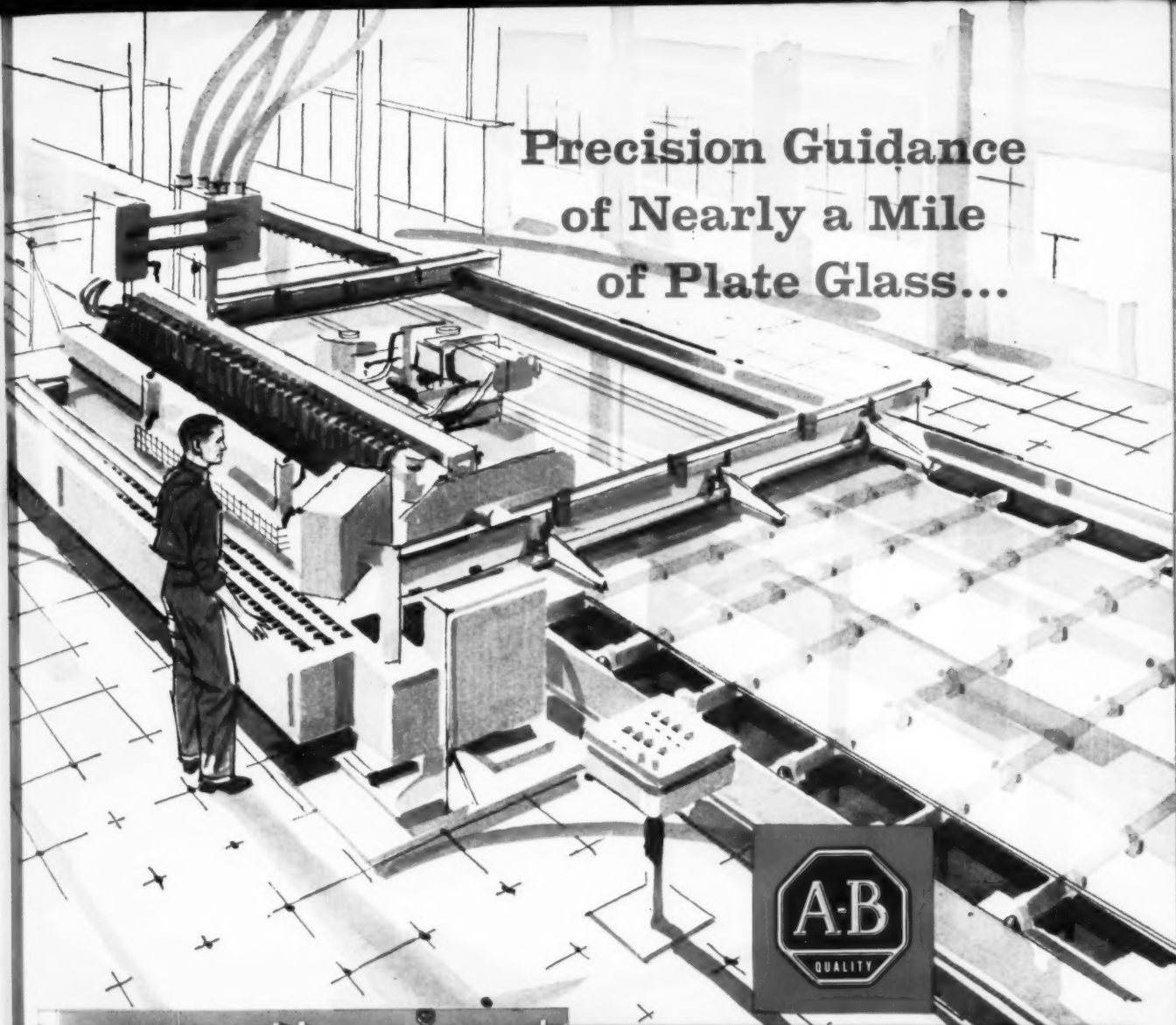
OHIO SEAMLESS TUBE DIVISION

of Copperweld Steel Company • SHELBY, OHIO

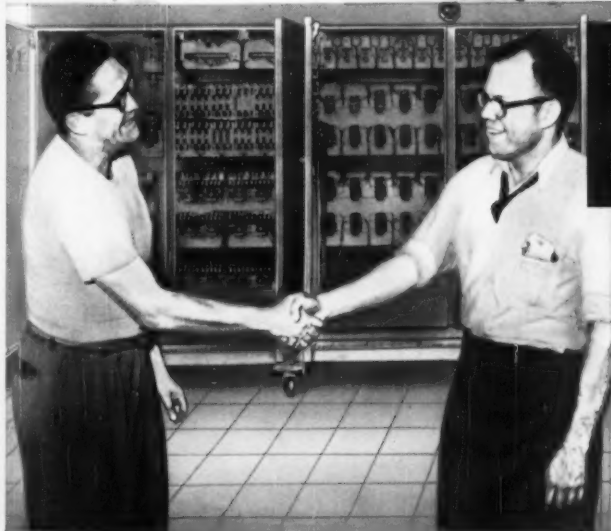
Seamless and Electric Resistance Welded Steel Tubing • Fabricating and Forging

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Precision Guidance of Nearly a Mile of Plate Glass...



controls by
ALLEN-BRADLEY
of course!



A series of control panels such as this is used in the Pittsburgh Plate Glass cutting room. Above are shown the Allen-Bradley engineers after completing the factory testing of the final panel.

The New Pittsburgh Plate Glass Plant at Cumberland, Maryland, heralds a new era in the art of plate glass making. Night and day, a continuous ribbon of glass is fed to a nearly mile-long process line. Then a complex control system directs the automatic cutting, sorting, and conveying of the glass to six areas, according to a continuously varying program.

Special control panels which integrate portions of this equipment into a unified, smoothly operating system were designed, developed, and engineered by Allen-Bradley. You can benefit by this extensive control experience . . . it is a "plus" value when you specify Allen-Bradley *quality* motor control.

Allen-Bradley Co., 1316 S. Second St.
Milwaukee 4, Wis.

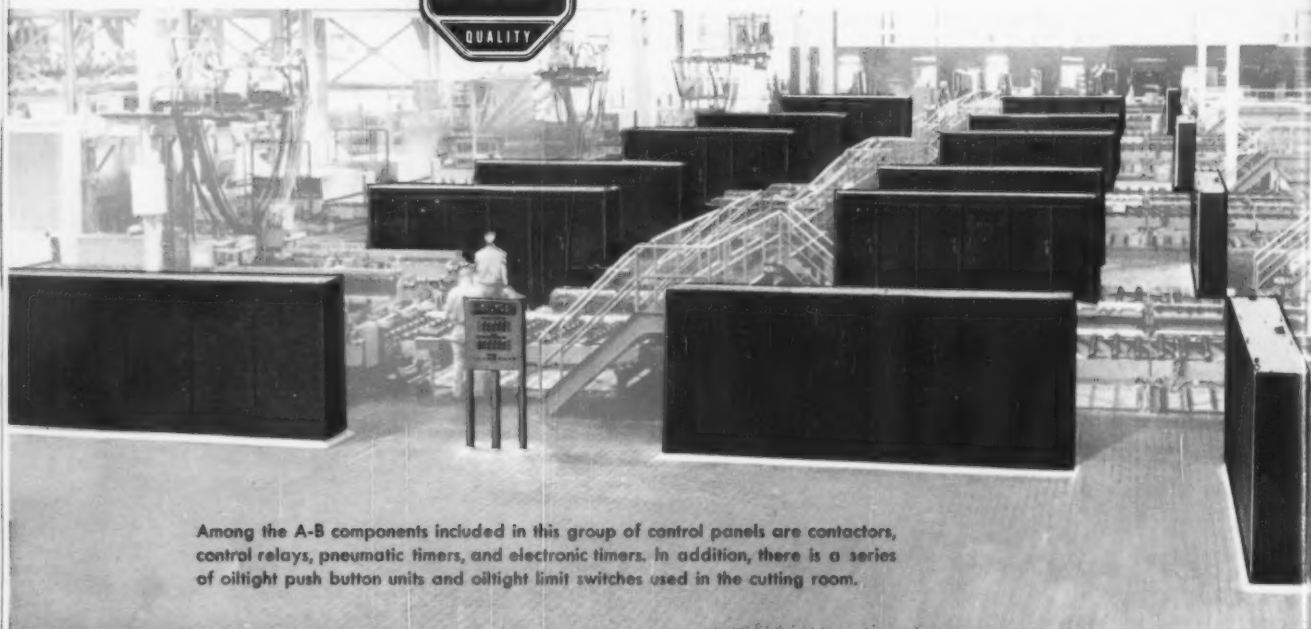
In Canada: Allen-Bradley Canada Ltd., Galt, Ont.

See on the next page how A-B Controls do it...

Plate Glass made by the mile with reliable ALLEN-BRADLEY Controls



In the cutting room at Pittsburgh Plate Glass (below), Allen-Bradley controls prove the reliability of their "simple design." All A-B solenoid starters, contactors, and relays have only ONE moving part . . . assuring millions of trouble free operations. There are no bearings or jumpers to cause trouble. Contact maintenance is also eliminated—A-B double break, silver alloy contacts remain in perfect operating condition until completely worn away. Insist on Allen-Bradley quality motor controls . . . you cannot do better!



Among the A-B components included in this group of control panels are contactors, control relays, pneumatic timers, and electronic timers. In addition, there is a series of oiltight push button units and oiltight limit switches used in the cutting room.

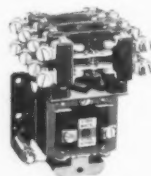
Some of the standard components which are used in this plant



Contactor—Bulletin 702, Size 3 shown. Made up to Size 8, rated 1350 amps, 220-550 v.



Solenoid Starter Bulletin 709, Size 2 shown. Made in ratings to 450 hp, 220v; 900 hp, 440-550 v.



Control Relay—Bulletin 700. Universal type relay with both N.O. and N.C. contacts shown.



Limit Switch—Bulletin 802T. Oiltight roller lever type shown. Also with many other operators.



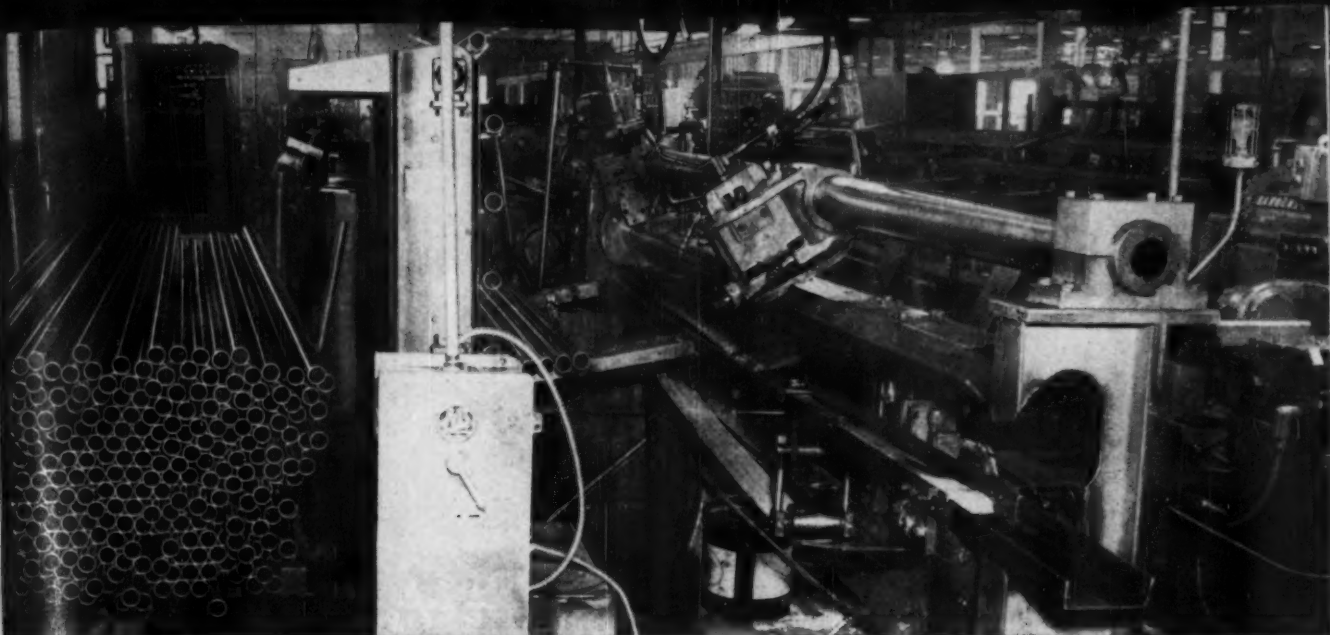
Pneumatic Timer Bulletin 849 for on-delay or off-delay. Range from 1/20 to 180 sec \pm 10%.

ALLEN-BRADLEY Quality Motor Control

Allen-Bradley Co., 1316 S. Second St., Milwaukee 4, Wis.
In Canada: Allen-Bradley Canada Ltd., Galt, Ont.

World's longest push button panel?
Six such control stations, each with this array of Allen-Bradley push buttons plus pilot lights, are used to select and operate cutters.





"Flexible Automation"

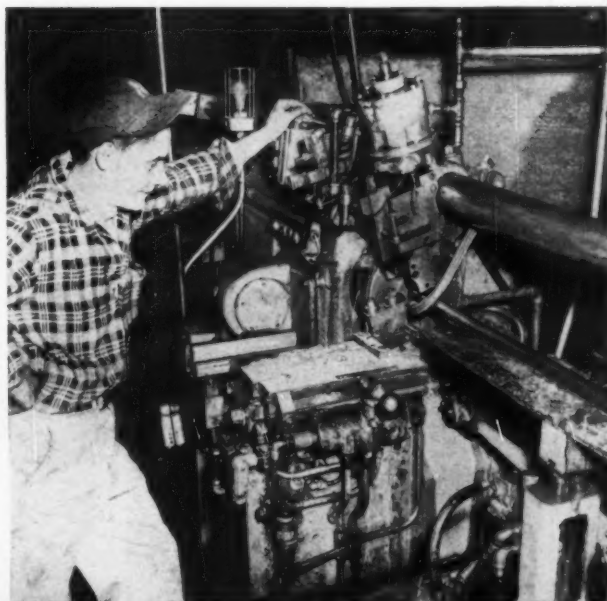
WITH BARDONS & OLIVER CUTTING-OFF LATHES

at Falls Steel Tube & Manufacturing Co., Newton Falls, Ohio

At Falls Steel Tube & Mfg. Co., manufacturers of exhaust pipes, tail pipes, and similar automotive tubular parts, the output of two electric weld tube mills is automatically transferred to three Bardons & Oliver loading tables. The tubing is then fed into three Bardons & Oliver Cutting-Off Lathes and automatically cut off in any required length from 6 inches to 10 feet. The cutoff lengths are automatically unloaded into tote trucks. Besides wide variance in length, tubing diameters vary from $\frac{1}{2}$ to 3 inches and wall thickness from 14 to 20 gauge.

Victor Beltram, Chief Engineer, reports labor reduced by 75% and cutoff capacity increased by 50% with the Bardons & Oliver installation. Previously, cutoff operations were performed on circular sawing machines. The cutting-off lathes produce square ends and smooth finishes which have greatly facilitated secondary operations. The increased cutoff capacity has allowed greater utilization of all plant facilities. The complete Bardons & Oliver installation has paid for itself in less than three years.

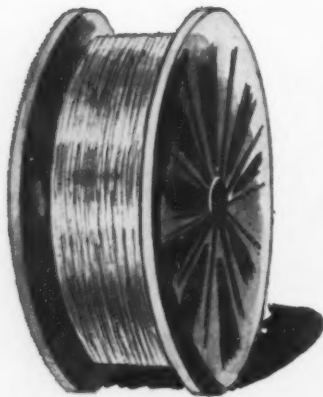
If you cut off spacers, bushings, nipples, couplings, rollers, similar tubular products, or solid bar stock, we suggest you explore the profit possibility offered by these versatile machines. Bardons & Oliver manufactures a complete line of Cutting-Off Lathes ranging in collet capacity from 2 to 16 inches.



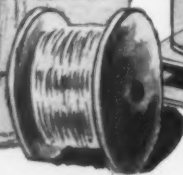
BARDONS & OLIVER

BARDONS & OLIVER, INC., 1136 WEST 9th ST., CLEVELAND 13, OHIO
Manufacturers of Turret Lathes and Cutting-Off Lathes

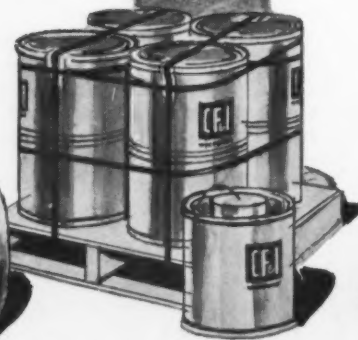
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Reels
(500-800 lbs. capacity)



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(250-600 lbs. capacity)



Standard Coils, paper-wrapped,
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WIRE...

PACKAGED for YOUR PRODUCTION

The CF&I Image represents the strength and dependability of all CF&I steel products. And for CF&I Steel Wire, this symbol reflects top quality. CF&I is the leader in designing packaging to reduce our customers' costs.

This is important to you! When you buy CF&I Steel Wire, you cut production costs—save time and money—by specifying the package that works most economically for you. You can choose a CF&I wire package that gives you the following special benefits:

- reduced downtime through extra long lengths of wire
- simplified inventory control
- fast, economical in-plant handling
- continued cleanliness of the wire

CF&I Steel Wire is available in a wide variety of gages and finishes. Whatever your wire requirements, be sure to order from CF&I. All orders—from a coil to a carload—will arrive at your plant packaged for your production. Let our nearest sales office know your requirements.

CF&I-WICKWIRE WIRE

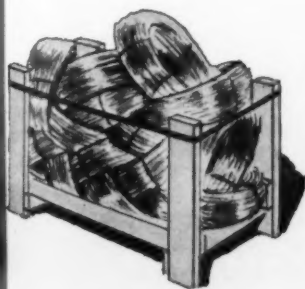
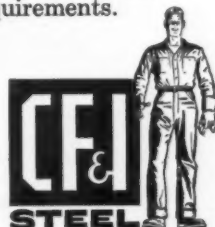
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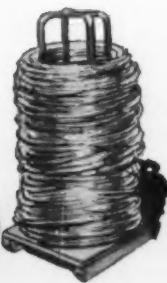
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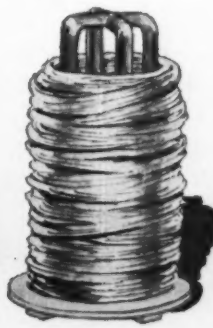
Steel-strapped
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Shaped Coils
(1500-2500 lbs. capacity)



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(100-600 lbs. capacity)

4426



use Airco's new Dip Transfer[†] CO₂ Process for **ALL-POSITION WELDING OF**

In welding mild sheet steel manually, there's only *one way to reduce costs and produce high quality welds* at the same time. Airco Dip Transfer CO₂ Process Welding. Let's be specific: —

- The complete Airco Dip Transfer CO₂ package welds in all positions . . . manually!
- Welds are hydrogen-free.
- Virtually ends warpage — only low average currents are used for burn off.
- Creates little or no spatter.
- Handles typical steel joint fit ups.

- No flux needed.
- Penetrates deeply — critical for high quality.
- Welds much faster than flux-based processes.
- Uses money-saving Pureco CO₂ as shielding gas.
- The basic equipment welds all weldable metals.

The Airco Dip Transfer CO₂ Process gives you consistently *high quality welds at lower costs* than any other process. For complete information, phone or write your nearest Air Reduction Representative. Ask for the new 24-page "AIRCOMATIC CO₂ WELDING" Catalog.

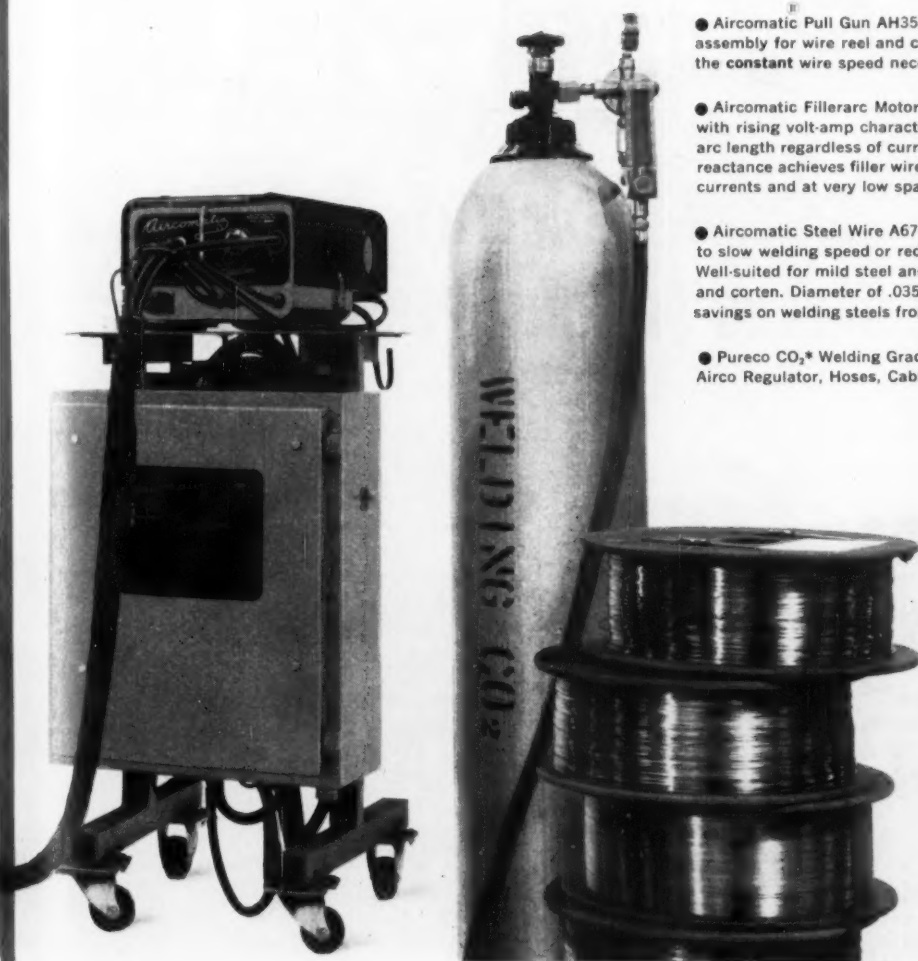
Here's what you need: —

● Aircomatic Pull Gun AH35A, with portable carriage assembly for wire reel and controls. Provides the constant wire speed necessary.

● Aircomatic Fillerarc Motor Generator Power Source, with rising volt-amp characteristic. Holds constant arc length regardless of current changes. Built-in reactance achieves filler wire turn-off at low average currents and at very low spatter levels.

● Aircomatic Steel Wire A675. Consumable. No flux to slow welding speed or reduce arc visibility. Well-suited for mild steel and alloys such as manten and corten. Diameter of .035" actually permits cost savings on welding steels from 16 ga. to ¾".

● Pureco CO₂* Welding Grade Gas. Plus associated Airco Regulator, Hoses, Cables, flexible wire casing.



STEEL IN ALL THICKNESSES

low costs • easy fit up •

high speed •

very low spatter • no warpage

†Trademark

**Patent Applied For

*Pureco CO₂ is supplied by the Pure Carbonic Company, a division of Air Reduction Company, Incorporated.



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A division of Air Reduction Company, Incorporated

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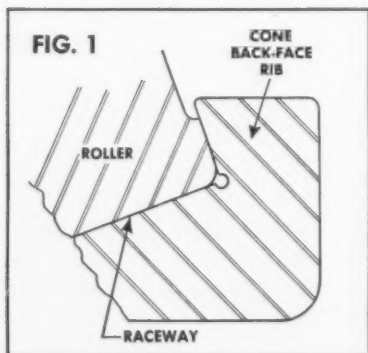


BEARING GEOMETRY MAKES OR BREAKS BEARING PERFORMANCE

To develop high capacity and optimum performance in a tapered roller bearing, it is essential that roller alignment be accurate. Correct roller alignment, in turn, depends on a critical geometric relationship between the cone back-face rib, and the cone raceway.

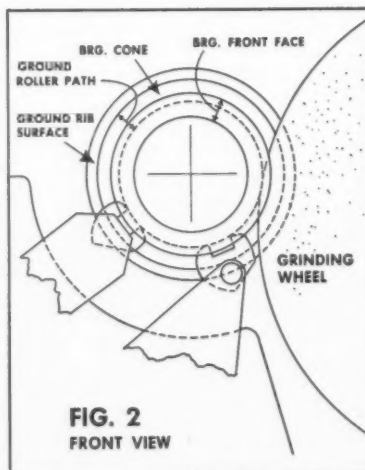
Perfection in this geometric relationship compels the rollers to align themselves perfectly with respect to the bearing geometry, and each roller shares equally in the work that is imposed. Figure 1 diagrams the important elements involved.

When this rib-to-raceway relationship is incorrect (because of either faulty bearing design or manufacturing inaccuracies), rollers experience misalignment and begin to skid and skew under



load. As engineers know, poor performance and premature bearing failure are inevitable under these conditions.

In the design and manufacture of Bower tapered roller bearings, Bower engineers take great care to generate and hold an exact face angle on the cone back-face rib. In practice, this means that Bower



bearings are designed for maximum life and optimum performance under any operating conditions. It means that Bower bearings retain accurate roller alignment under all speeds and loads up to the maximum for which the bearing is rated.

It's one thing to develop proper bearing design on paper, but quite another to carry it out consistently in manufacture. To this end, Bower engineers were instrumental in the design and development of a unique centerless grinder on which Bower precision grinds each bearing's cone raceway and rib-face simultaneously. The results obtained from these machines invariably meet or surpass

Bower's exacting requirements and assure perfect roller alignment.

Figures 2 and 3 are front and side views which illustrate Bower's technique of centerless grinding rib-faces and cone raceways together. As a result, every component in a Bower bearing is perfectly concentric about its rolling axis.



★ ★ ★ ★

When you require bearings, we suggest you consider the advantages of Bower bearings. Where product design calls for tapered or cylindrical roller bearings or journal roller assemblies, Bower can provide them in a full range of types and sizes. Bower engineers are always available, should you desire assistance or advice on bearing applications.

BOWER ROLLER BEARINGS

BOWER ROLLER BEARING DIVISION — FEDERAL-MOGUL-BOWER BEARINGS, INC., DETROIT 14, MICHIGAN

At Boyertown
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"E" Sheets are being
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Accent on Excellence

Youngstown Yoloy "E" sheets



Send for free technical
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Yoloy "E" Steel.

True value in Boyertown bodies is the trouble-free, year-in, year-out service they provide. It's a value that starts with skilled craftsmanship—using only the best raw materials available.

Boyertown Auto Body Works, Boyertown, Pa., specifies Youngstown Yoloy "E" Hot and Cold-Rolled Sheets as basic material for both the outside and inside panels, as well as for certain structural frame members such as rear corner posts and roof crowns, of their delivery truck line. They've found this versatile steel's high strength-low weight ratio allows design of higher payload vehicles.

Wherever high-strength steel becomes a part of things you make, the high standards of Youngstown quality, the personal touch in Youngstown service will help you create products with an "accent on excellence".

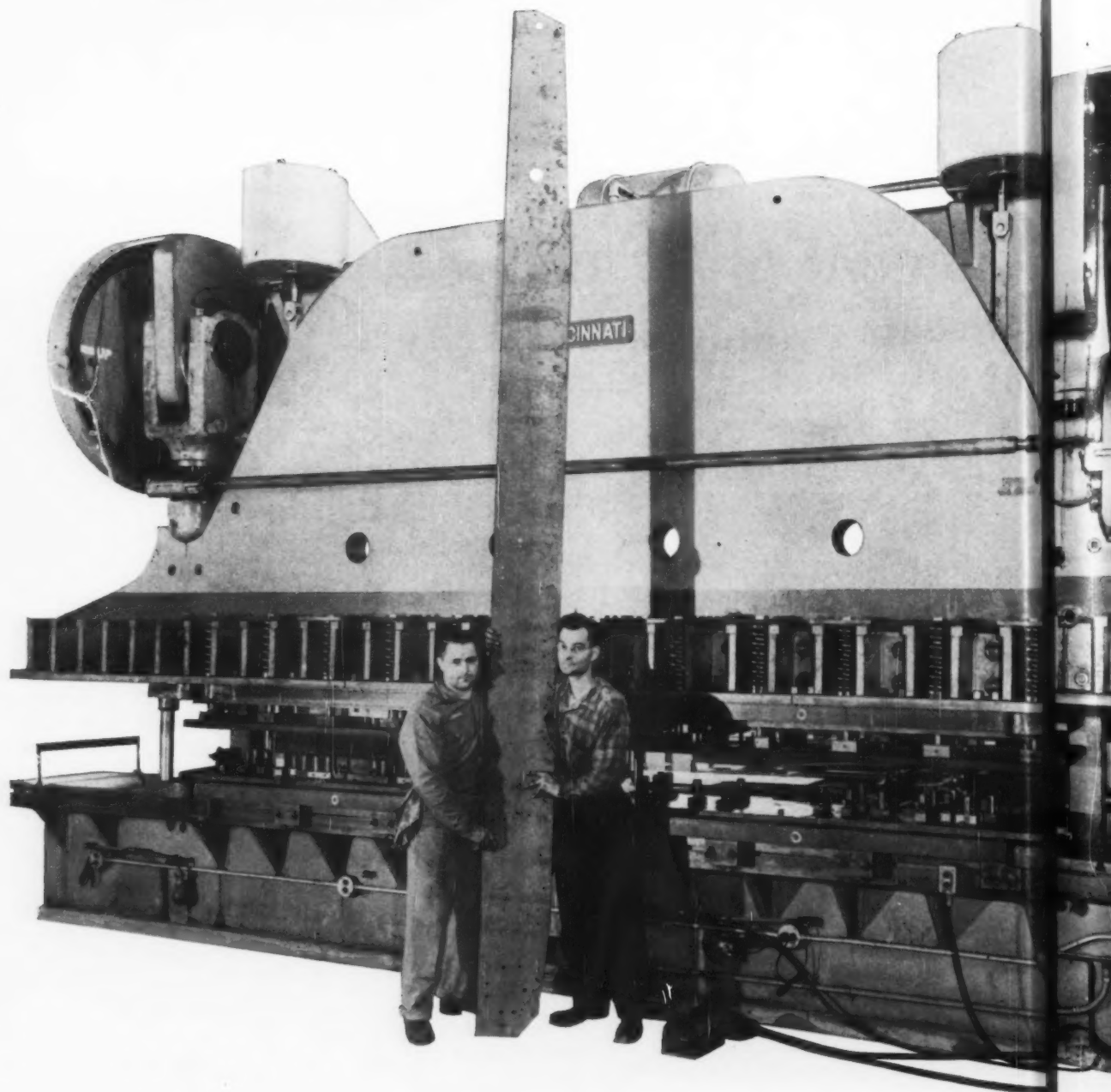


Youngstown
Youngstown, Ohio

THE YOUNGSTOWN SHEET AND TUBE COMPANY

Carbon, Alloy and Yoloy Steel

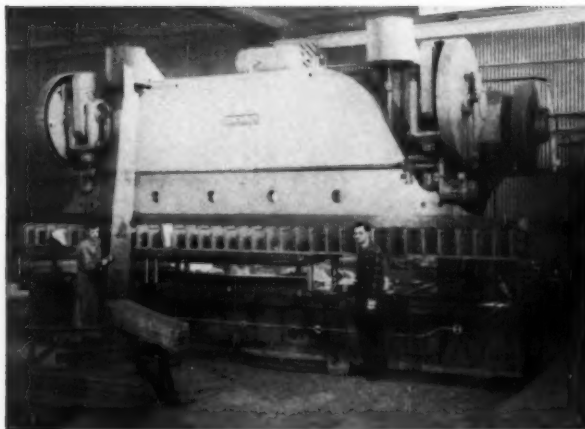
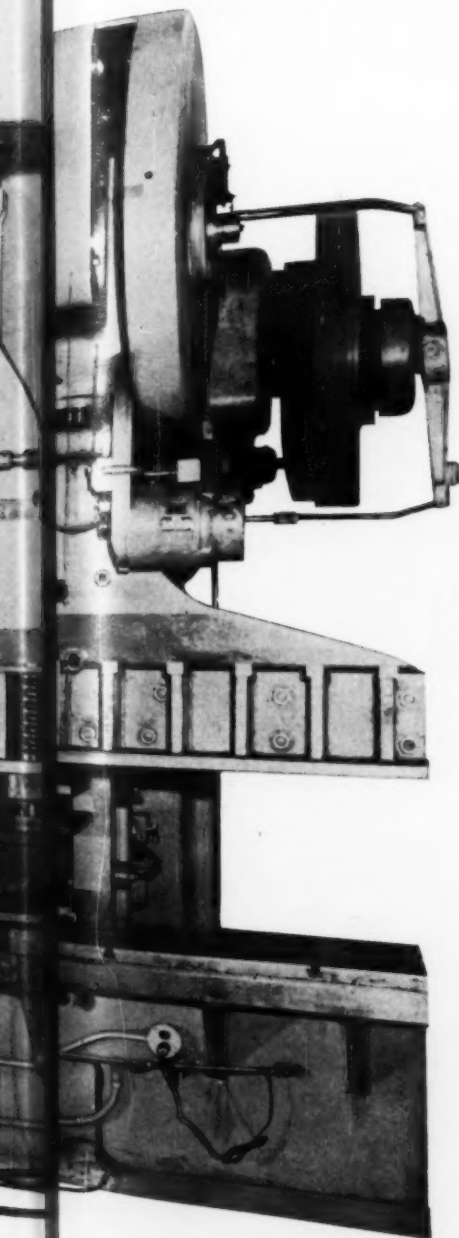
70 minutes



Punching floor-to-floor time cut from 36 to 1½ minutes.

Photos courtesy Fort Wayne Structural Steel Co., Inc.

cut to **2.6** min.



Blanking floor-to-floor time cut from 34 to 1¼ minutes.

In combined blanking and punching operations, production time has been cut 96.2% on these long truck side rail reinforcements, thanks to the versatility of this Cincinnati® All-Steel Press Brake.

Operating data, furnished by John L. Hayner, President Fort Wayne Structural Steel Co., Inc., show how his company substantially slashed production costs.

They decreased floor-to-floor time from 34 minutes to 1¼ minutes on blanking ¼" C1010 Steel with a 202" cutting edge. By punching 130 holes per stroke, floor-to-floor time reduced from 36 minutes to 1½ minutes.

Talk with our Application Engineering Department about applying a time-cutting Cincinnati Press Brake in your shop. It can be the most profitable decision you've made this year. Write Department B for Press Brake Catalog.

Shapers / Shears / Press Brakes



THE **CINCINNATI**
SHAPER co.

Cincinnati 11, Ohio, U.S.A.



1ST

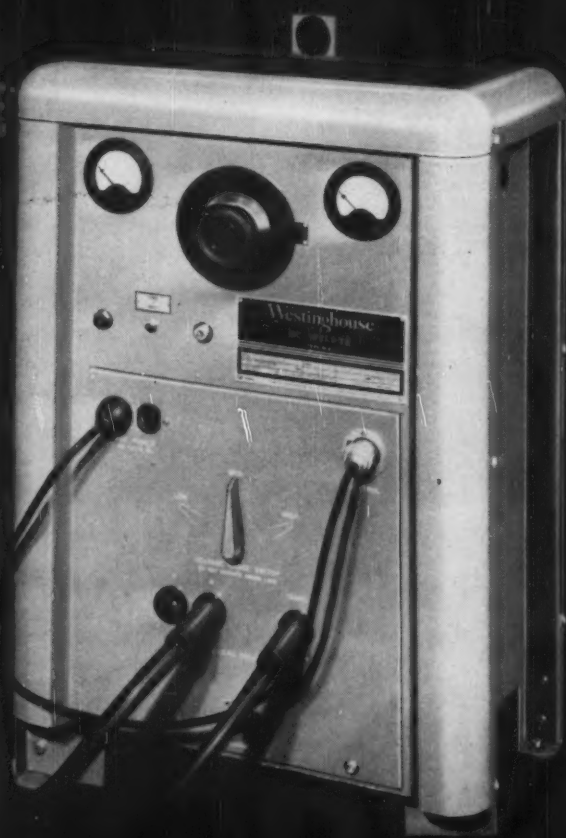
The outstanding Type RCP, Constant Potential Power Source for gas shielded fully automatic and semi-automatic welding. Available in 500, 600 and 1000 amp ratings to suit every need. May be used with separate Dynamic Reactor.



2ND

A complete 200-amp. Type RCC Constant Current Welding Power Source "package" for use with the popular WESTING-ARC® SA 110 and SA 111 semi-automatic hand guns and control monitor. Converts to manual welding use at the flick of a switch.

NOW!





ANOTHER ADVANCEMENT TO EXTEND YOUR WELDING VERSATILITY

Westinghouse

"RCV" Welding Power Source

WITH BUILT-IN DYNAMIC REACTOR

It's the NEW 200-amp, Type RCV Constant Potential Power Source for gas-shielded welding—specifically designed as the most important "companion" for the WEST-ING-ARC SA-120 and 121 hand gun and control monitor.

The RCV Power Source, with its built-in contactor and controls and built-in Dynamic Reactor, opens new fields for welding of light-gauge

steels—mild and stainless—aluminum and magnesium. It permits all-position welding . . . reduced welding wire costs . . . improved "wash" and penetration over a broad range of applications and material thicknesses.

Contact your nearest Westinghouse welding distributor or welding sales engineer. Or write: Welding Division, Westinghouse Electric Corporation, Buffalo 5, New York.

J-22001

Features:

- Primary circuit breaker with full over-current protection • Thermoguards® in each transformer winding for thermal protection • Single phase—230 volts. May be used where higher primary voltage is not available; reconnectable for 460 volts • Auxiliary transformer for 110 volts to supply control monitor • Built-in contactor—operated by trigger of SA-120 and 121 gun
- Built-in Dynamic Reactor • Bonderized finish
- Dead-front Cam-Lok cable terminals and plug connection.

And many other user advantages!

\$795 IN ZONE 1

Zones 2 and 3 slightly higher

YOU CAN BE SURE...IF IT'S **Westinghouse**

WATCH "WESTINGHOUSE LUCILLE BALL-DESI ARNAZ SHOWS" CBS TV MONDAYS

Watch Westinghouse for New Developments in Welding

Chances of
SLIP-UPS

*are sharply reduced
with*

HENDRICK

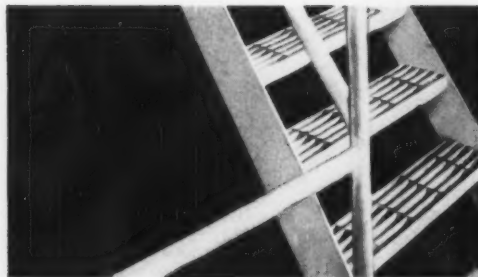
MITCO GRATING

SHUR-SITE TREADS



BECAUSE IT NEVER CLOGS

Hendrick Mitco Open Flooring is non-clogging because it has no bolts, rivets or acute angle joints that collect dirt and refuse. Its 90% open area reduces accidents by increasing in-plant light and visibility, too. What's more, it will not bend or warp because the self-contained Mitco lock is protected from corrosion, acid fumes, and other damaging elements. Nineteen sizes are available, including heavy-duty gratings that take even the roughest loads and continuous wear.



BECAUSE STEP EDGE IS PLAINLY VISIBLE

Hendrick Shur-Site Treads have a deep nosing bar bent back under the front edge of the tread. This patented feature makes the step edge highly visible and so minimizes accident risk. The bar is self-clearing—will not retain dirt, refuse or snow. The 90% open area of Shur-Site Treads will not obstruct light or air. Shur-Site Treads are available in standard sizes or in special widths and lengths, shipped ready to bolt directly to stair stringers. Write for further details today.

HENDRICK

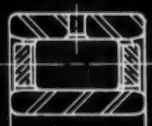
MANUFACTURING COMPANY 37 DUNDAFF STREET, CARBONDALE, PA.

PERFORATED METAL • PERFORATED METAL SCREENS • WEDGE-SLOT SCREENS • HENDRICK WEDGE WIRE SCREENS • ARCHITECTURAL GRILLES • MITCO OPEN STEEL FLOORING — SHUR-SITE TREADS • ARMORGRIDS • HYDRO DEHAZERS • DISTILLATION COLUMN INTERNALS

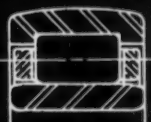
Who but **MESSINGER** makes them all?

Each has its advantage

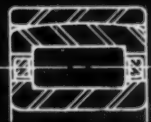
RADIAL ROLLER



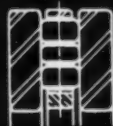
SELF-ALIGNING RADIAL
WITHOUT ADAPTER



SELF-ALIGNING RADIAL
WITH ADAPTER



SINGLE THRUST



FROM "FEATHERWEIGHT" TO "HEAVYWEIGHT" SECTIONS

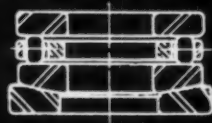
TWO DIRECTION THRUST



COMBINATION



SELF-ALIGNING THRUST



YOUR REQUIREMENT DICTATES THE SIZE AND TYPE

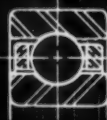
"X"



4-POINT CONTACT



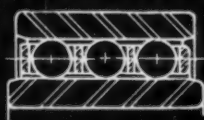
ANNULAR BALL



BALL THRUST



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BEARINGS AVAILABLE IN SIZES UP TO 200 INCH DIAMETER
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Smoothing Industry's Pathway

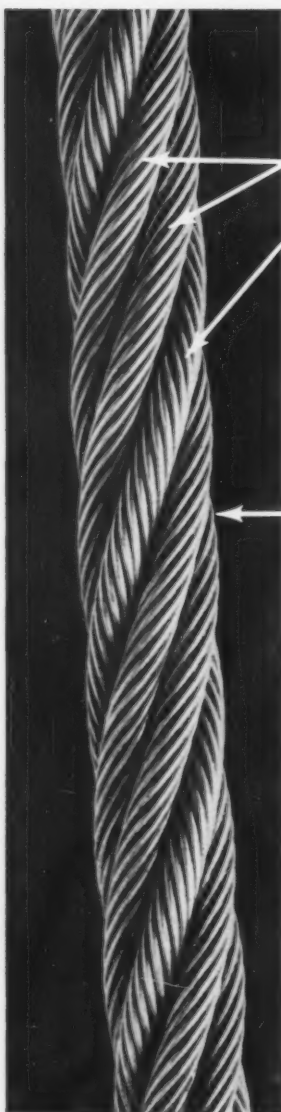


...for Nearly Half a Century

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BALL AND ROLLER BEARINGS • FEATHERWEIGHT TO HEAVYWEIGHT



Herringbone's two pairs of Lang lay strands and one pair of regular lay strands provide the ideal combination of maximum flexibility with good stability.

Finer wires inside contribute to Herringbone's excellent drum-winding characteristics.

Heavier outside wires in each strand have greater resistance to abrasion.

“...and
it
has



a much longer life”

GASKILL CONSTRUCTION COMPANY

The above quote is one of the things that Gaskill Construction Company says about the new Roebling Herringbone* Wire Rope. There are further quotes: “. . . We, after giving your Herringbone cable a great deal of use, find that it is far superior to any other cable and it is much more economical.”

These are user statements about the newest design development in wire rope in many years. Herringbone is the regular lay and Lang lay wire rope. It is two-ropes-in-one rope, with the best features of each in combination. It has been used, with the same suc-

cess quoted here, on a wide variety of machines as well as on tough hoisting jobs. Its potential is virtually unlimited wherever all-steel ropes are specified and on most installations where fiber core ropes are standard.

Your Roebling Distributor has full details on Herringbone, or contact Wire Rope Division, John A. Roebling's Sons Corporation, Trenton 2, New Jersey.

*Reg. App. For

ROEBLING

Branch Offices in Principal Cities
Subsidiary of The Colorado Fuel and Iron Corporation



This is a picture of

It's nothing you can use in your plant tomorrow — or even next year. But Allis-Chalmers is working on it *now* to meet the needs of industry in the future.

Fundamental research of materials, processes and equipment is an important part of the A-C contribution to industry. *This enables product design engineers to make existing products even better, to create a continuous flow of new equipment, to help industry achieve new efficiencies and economies.*

Research and development are only two reasons why A-C is recognized as a leader in supplying both electrical and mechanical equipment for industry. Single-source availability of "teamed" equipment, maximum engineering help and outstanding service facilities are others.

Talk to your A-C representative or distributor soon about your requirements. Or write Allis-Chalmers, Milwaukee 1, Wisconsin.

a new product



ALLIS-CHALMERS

A-1004-G1



THIS high temperature, high pressure experimental apparatus is used to induce changes in existing materials, to produce new materials. From such experiments come new equipment efficiencies and economies.

FRASSE ALUMINUM

helps tell
how she's doing!



Ballistic missile success hinges on intelligence obtained in test firings. Tracking data—reporting velocity, direction, altitude, temperature, etc. is vital—when processed, it guides critical design changes.

Heart of the intricate data processing system at Cape Canaveral is a Potter Magnityper—a high speed electronic printer that decodes raw material... then stores, collates, interprets and prints at 72 thousand characters per minute. Lightweight, non-magnetic aluminum is essential to its efficient operation—that's why the Magnityper is made almost completely of Frasse aluminum.

Frasse ships the required sizes quickly from stock—in the grades that

contribute to its ease of fabrication and performance. For example, Frasse supplies 2024-T4 bars for *strength* and *machinability*, 5052-H34 sheet for *formability* and *weldability* and "775" tooling plate for *dimensional accuracy* with *no distortion* when worked.

Perhaps these same qualities can increase the efficiency of *your* product—or reduce fabricating costs. It's worth investigating—and a Frasse aluminum specialist will be glad to help. There's no obligation—simply write or call your nearest Frasse office. You'll be glad you did.

Call FRASSE for ALUMINUM



Screw Machine Stock • Bars • Rods • Wire
Sheets • Plates • Tubing • Holobar
Pipe • Fittings • Valves • Extrusions
Tool and Jig Plate

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Allis-Chalmers tackled this motor problem "cold"

Even heavy icing couldn't freeze this motor. An Allis-Chalmers customer required that this open-type *Super-Seal* motor start even though embedded in ice.

Successful tests were conducted in the A-C Motor Laboratories where customers' motor needs point the way to continuous development programs.

Research and testing of this type has established Allis-Chalmers as a pioneer-leader in the motor industry. It has led to the most complete line of integral-horsepower motors; it has led to tremendous acceptance of such A-C developments as *Synduction* and tube-type motors, and now *Super-Seal* motors.

You can benefit from this pioneer-leadership by contacting your A-C representative or distributor, or by writing Allis-Chalmers, General Products Division, Milwaukee 1, Wisconsin.

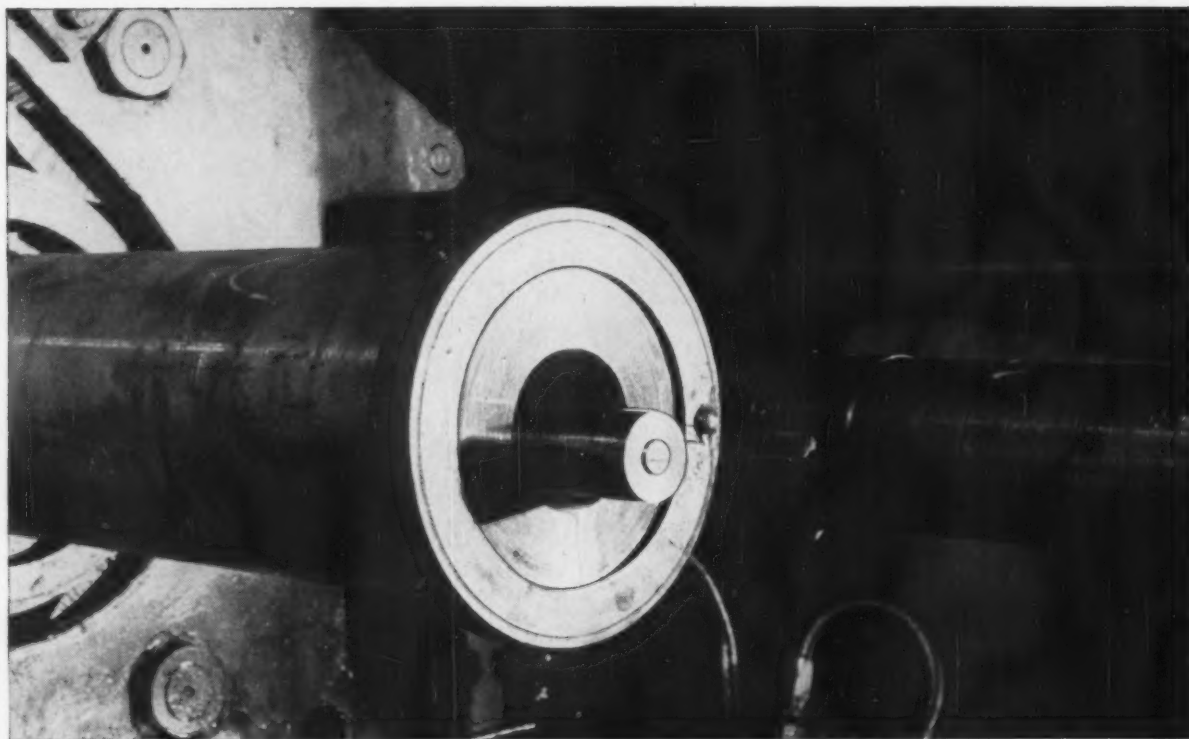
Super-Seal and *Synduction* are Allis-Chalmers trademarks.

ALLIS-CHALMERS



A-5956-G1





When only the best is good enough . . .

KENNAMETAL* is first choice to keep this half-million dollar lathe in operation

This illustration shows the end of a 30-foot drill collar that has been trepanned on one of the largest lathes in the country. When collars were bored in the conventional manner, the job took from 18 to 24 hours per piece. On this lathe, a minimum of three collars are bored per shift. This is not only one of the largest lathes, but probably one of the highest priced in use today. Machine time is charged at \$50 an hour.

The payoff on this initial investment, and on the high machine-time-charge, comes from a couple of Kennametal carbide inserts that cost \$1.50 each and three pads that keep the cutting head centered. These pads are also made of Kennametal and cost about \$1 each. Less than \$10 worth of tools keep this half-million dollar machine producing!

*Trademark

The inserts must withstand severe abrasive cutting conditions and high cutting-speed temperatures. The pads must possess unusual resistance to abrasion and deformation to prevent the slightest deviation of the head from the center line. In purchasing the tools, the owners are not only buying *cutting* ability, but *dependability*. The cost of any shut-down is so great that only the best tooling available can be justified. Every type of tool material . . . old and new . . . is continually being tested and evaluated. But nothing has been found, at any price, more reliable than Kennametal carbides.

Kennametal cutting speeds and Kennametal dependability help make tool costs the lowest item in manufacturing costs. If you are looking for ways to cut expense and in-



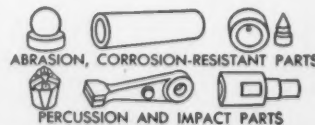
Photo shows cutter heads used on lathe, also two sizes of Kennametal inserts, with K-2 pads to center cutting head.

crease production, it will pay you to investigate what Kennametal tooling can do for you. Write KENNAMETAL INC., Latrobe, Pennsylvania.

3109



INDUSTRY AND
KENNAMETAL
...Partners in Progress



CORRECT APPLICATION

is the key to semi-conductor rectifier efficiency

Sure, you're looking for the high conversion efficiency, low maintenance and simplified operation associated with semi-conductor rectifiers. And you'll get all these advantages — and more — if the semi-conductor rectifier is a right-for-the-job installation.

Your local Allis-Chalmers man will be glad to tell you whether or not a semi-conductor rectifier is best for your specific operation. He can afford to be completely unbiased in the approach to your problem because Allis-Chalmers makes *all types* of power rectifiers. At his disposal, and yours, are vast research and engineering facilities. Behind his recommendations is the assurance found in the fact that Allis-Chalmers has been developing, building and applying rectifiers for almost 25 years.

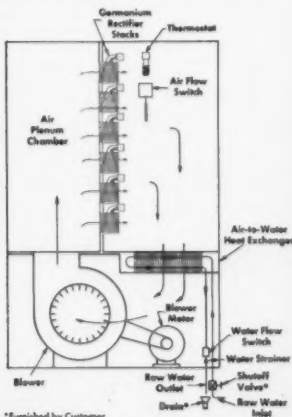
For complete information, call your A-C representative or write Allis-Chalmers, Industrial Equipment Division, Milwaukee 1, Wisconsin. In Canada, write Canadian Allis-Chalmers Ltd., Box 37, Montreal, Quebec.

ALLIS-CHALMERS

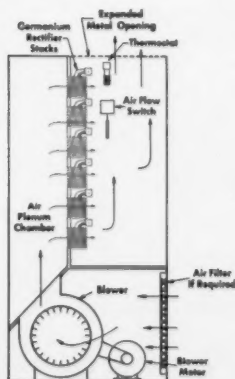


A-5950-MW

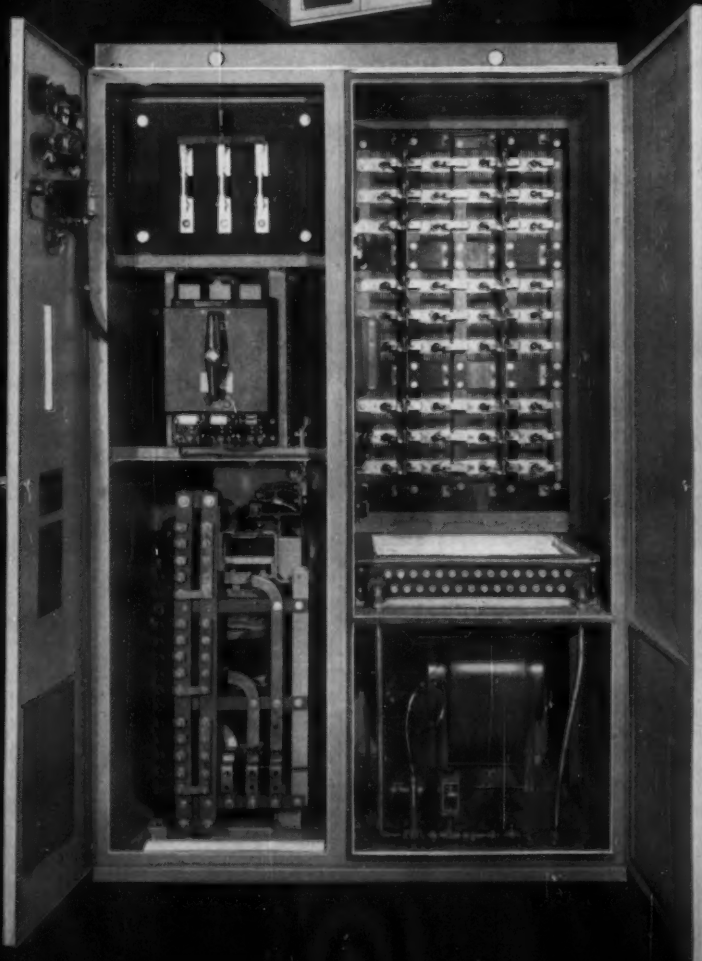
CHOICE OF COOLING SYSTEMS

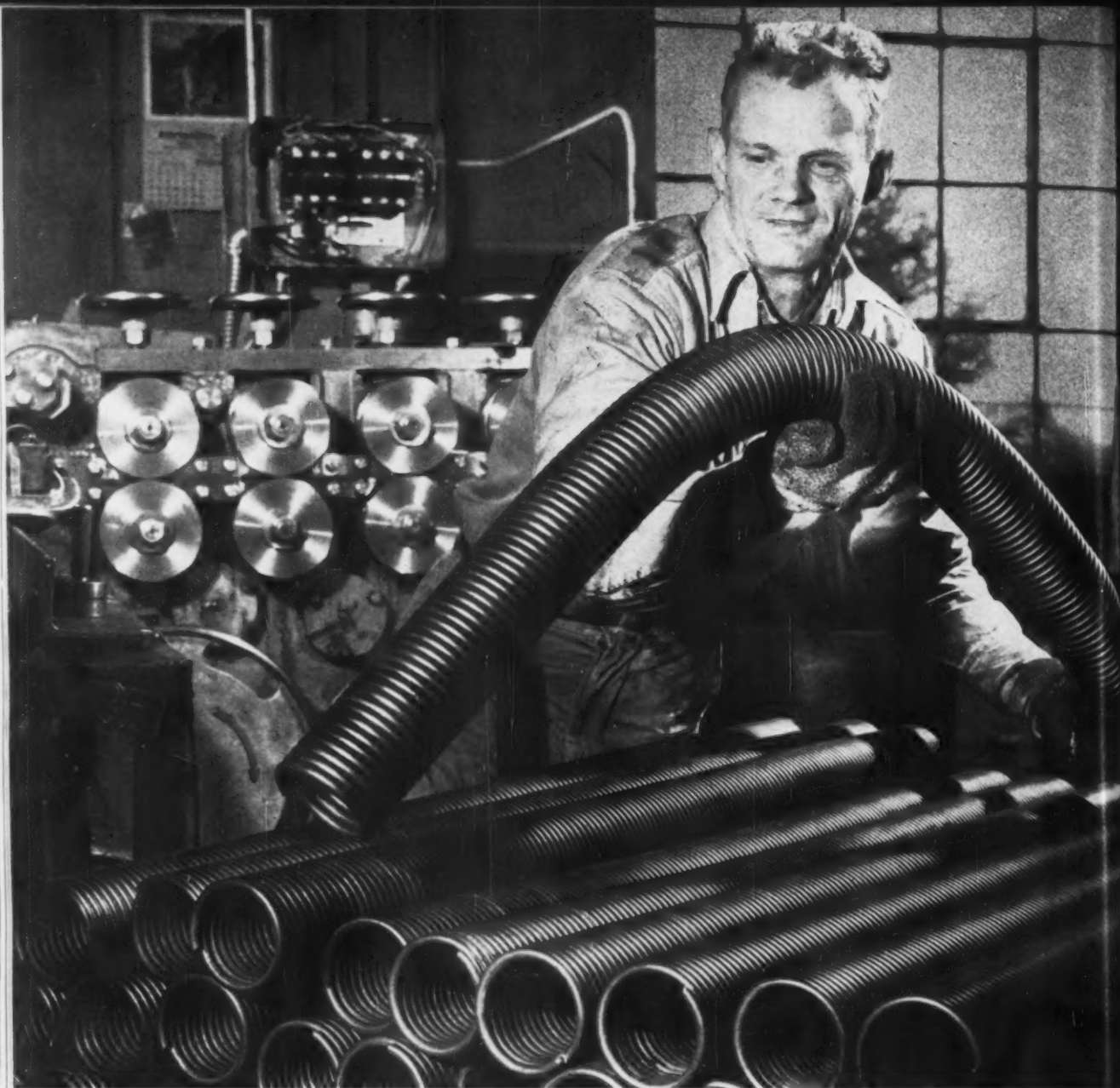


A recirculating air system featuring an air-to-water heat exchange is employed where atmosphere is corrosive or dusty.



A simple air-cooling method is recommended for use in near normal atmospheres and where water is not available.





Torsion springs for Crawford Door Co.'s Marvel-Lift garage doors are coiled from Pitts-

burgh Steel Co.'s Oil Tempered MB Wire, from wire .168 inch to .468 inch in diameter.

How Pittsburgh Steel's Wire Makes . . .

Springs That 'Rate'

**Crawford Door Co. Depends on Uniformity of Pittsburgh Steel Wire
For Precise Engineering of Marvel-Lift Garage, Industrial Doors**

Torsion springs which operate Crawford Door Company's garage and industrial doors have to "rate." Here, rate means the force stored up in the spring to supply power for smooth, efficient, finger-tip raising and lowering.

The rate built into any spring—from a 42½-inch long spring on a

single car Marvel-Lift residential garage door to a 12-foot long spring on an industrial door—depends on uniformity of wire diameter.

Lack of uniformity throws off engineering calculations and spoils spring performance. Let Elliott Koepfgen, chief engineer

for Crawford Door, explain how uniformity of Oil Tempered MB Wire supplied by Pittsburgh Steel Co. helps him design torsion springs to meet pre-determined rates:

"Each of our springs is made to meet a definite rate. This rate is the

torque which can be exerted in one turn of the spring. It provides the force stored up in the spring to operate the doors. By calculating the diameter of the wire, the number of coils and the number of turns the spring is turned back against itself, we can design a spring with the rate we know is necessary to lift a door of a certain weight and height.

"Uniform diameter is a must since variations would drastically affect spring performance. Uniformity helps us design efficient springs which will last the life of the door. If we overbuild the spring we run up production costs. If we underbuild, we get failures in service and customer dissatisfaction.

"Pittsburgh Steel supplies us Oil Tempered MB Wire we can count on to be so uniform that we can treat wire diameter as a known factor in our engineering calculations."

Here's how it works in two typical designs: for an eight-foot high, 128-pound door in a single car residential garage, Mr. Koepfgen specified a spring made from .263-inch diameter wire. The wire was coiled into a 14.5-pound spring 42 $\frac{1}{4}$ inches long with 160 coils. Because the wire was uniform in diameter, each spring made to these specifications had a rate of 60 when the springs were turned back on themselves 7 turns each.

Or take a large industrial door application. For a specially engineered door 12 feet high and weighing 654 pounds, Mr. Koepfgen specified a spring made of .468 wire. The spring was 78 $\frac{3}{4}$ inches long, weighed 234

pounds and had a rate of 271 when the spring was turned back 7 $\frac{1}{4}$ turns. Because of uniformity in wire diameter, the spring and door combination worked perfectly after installation.

• **Buys 23 gages**—Crawford Door Co. relies on Pittsburgh Steel Co. for oil tempered wire in 23 gages, ranging from .168 inch in diameter for springs 26 inches long to wire .468 inch in diameter, used to coil springs up to 14 feet long.

Uniformity of diameter isn't the only requirement. Crawford Door also insists upon, and gets from Pittsburgh Steel Co., wire with these qualities:

1. Fatigue strength—Springs

must have long life without taking a set since garage doors are expected to last indefinitely even in busy places like gasoline service stations.

2. **Coilability**—Automatic coiling machines can't operate efficiently or economically unless the wire runs through the coilers smoothly. So Crawford wants a good surface free from defects.

3. **Proper Temper**—Oil tempering and heat treating at the wire mills of Pittsburgh Steel produce wire free from soft and hard spots so that wire can be coiled without bulges which affect performance and shorten spring life.

Plant Manager M. J. Duffy says Pittsburgh Steel supplies wire in shipment after shipment which "gives consistently good results without slowing production or piling up rejects."

Whatever your requirements for manufacturers' wire, whether you're making bobby pins or springs, you'll benefit from the skill and mill facilities which produce wire tailor-made to this customer's specifications. A mill-trained representative is as close as your telephone to help you solve your wire problems or show you how Pittsburgh Steel Co. wire can help reduce costs while improving your product. Call a Pittsburgh man today in the nearest district office.



Oil Tempered MB Wire from Pittsburgh Steel Co.'s wire mills is checked at Crawford Door plant by M. J. Duffy, plant manager, left, and W. D. Williams, Pittsburgh Steel Co. salesman.



Installation on garage door. Spring is turned back on itself the calculated number of times and mounted on tubular shaft running width of door. Cables fastened to drums at each side of shaft raise or lower doors. When door is lowered, door weight winds up spring, storing power to be used in raising the door. Lift is applied to both sides of door so it raises evenly, gliding upward in absolutely level position.

Pittsburgh Steel Company

Grant Building

Pittsburgh 30, Pa.



District Sales Offices

Atlanta Cleveland Detroit
Chicago Dayton Houston

Los Angeles Pittsburgh
New York Tulsa
Philadelphia Warren, Ohio

A Completely Self-Contained High-Frequency Induction Melting Unit That Can Be Installed In 2 Hours

Ideal for Air or Vacuum Melting, Sintering and Hot Pressing

The Inducto Integral 30 is an efficient and economical melting unit that can be easily adapted to a variety of applications. Its console control panel contains all the equipment necessary to operate high-frequency induction furnaces and coils—a motor-generator set, capacitors, transformer and complete controls. Over 20 capacitor and 8 transformer steps, easily controlled from the front, provide the necessary flexibility to assure matching full power to all load conditions throughout the heating or melting cycles. The entire unit is designed for maximum dependability and ease of operation.

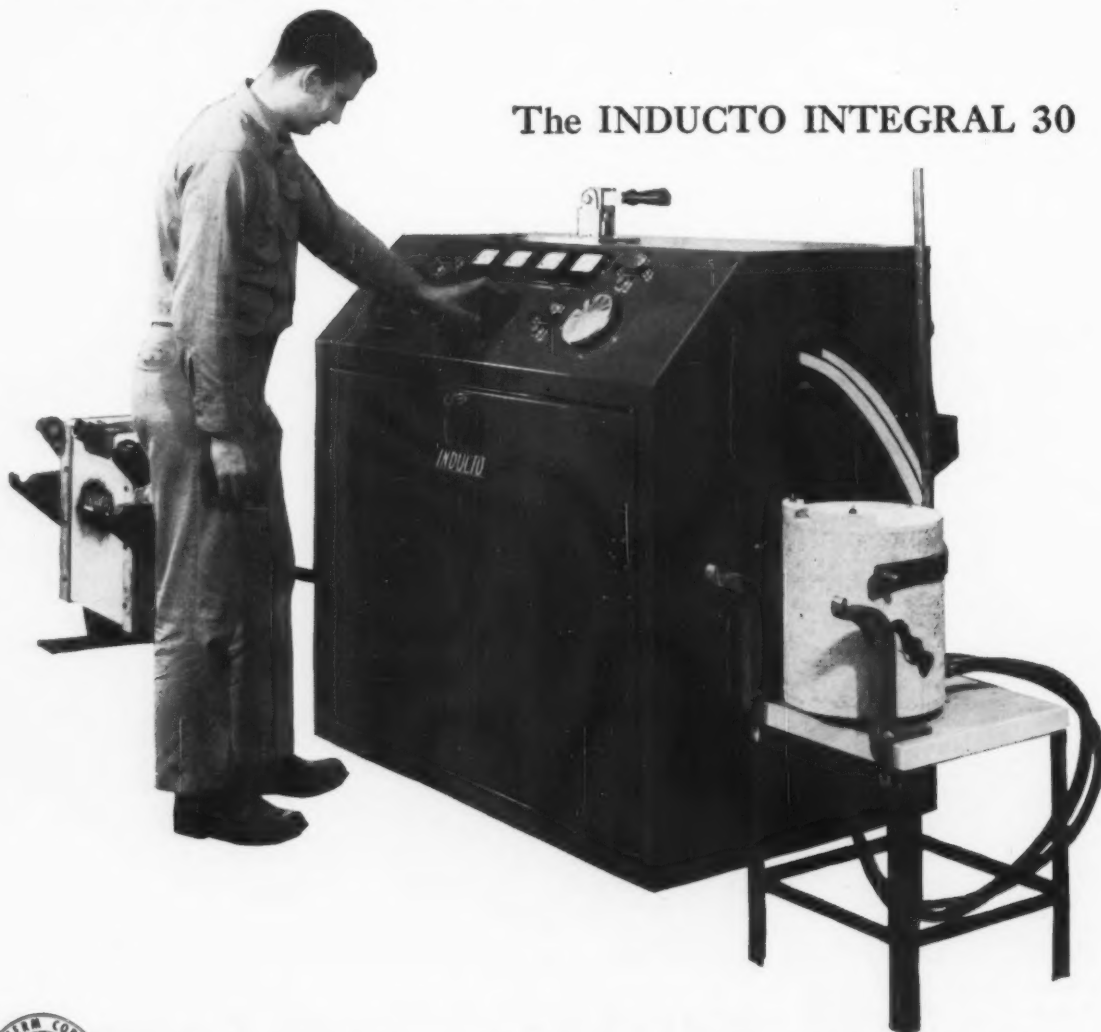
The Integral 30 is installed simply by connecting it to a 220 or 440 volt power supply, a cold water line and a drain. In fact, it is so compact and easy to install any-

where, the console can be made portable just by mounting it on casters.

Unique water-cooled leads simultaneously supply power and water to the furnaces. The same leads, with slight modifications, provide an economical power entry system for vacuum melting applications.

The Integral 30, with all the advantages of induction melting and Inducto engineering features, is truly the outstanding melting unit in the 5 to 100 pound range. No other equipment can offer you the same versatility, efficiency and economy. For complete details, write for Descriptive Bulletin 20-30, Inductotherm Corp., 412 Illinois Ave., Delanco, N. J.

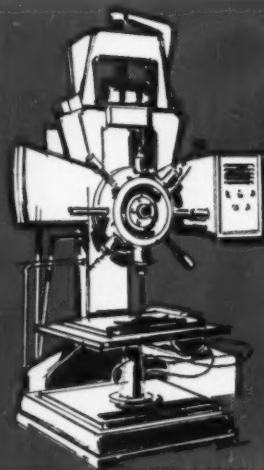
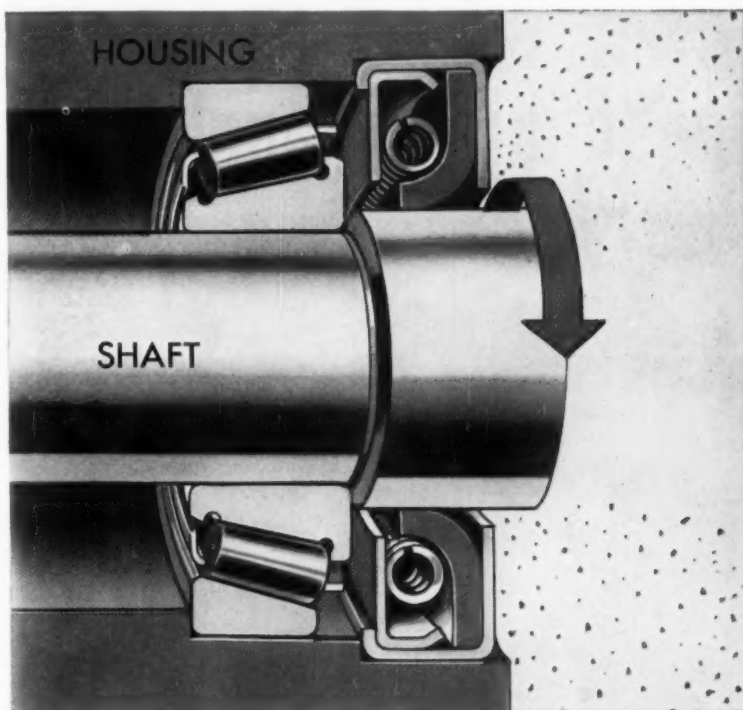
The INDUCTO INTEGRAL 30



INDUCTOTHERM

... the mark of modern melting

Better products, *faster*, from your Bearing Specialist:



MINIMIZE DOWNTIME
on production machines
with National Oil Seals in
leather or synthetics.

**In leather or synthetic, National industrial oil seals
keep lubricant in, dirt out of your valuable machines!**



National Oil Seals feature: 1. *Micro-Torc* leather that seals in oil and grease, has untreated side to absorb lubricant; 2. *Syntech* synthetics "prescription-blended" to meet specific operating conditions.

National Micro-Torc and Syntech oil seals—in any standard size or made to order—protect big investments at low cost

Count on National Oil Seals to guard your costly machines! They seal *in* the lubricant so vital to precision bearings; seal *out* abrasive dirt and corrosive moisture so harmful to bearings and other machine components—and there's one for *any* job.

National Micro-Torc leather is impregnated only part-way through. The coated side seals perfectly; the untreated, porous side absorbs the lubricant leather needs to stay flexible, run cooler and longer. National Syntech synthetics are "prescription-blended" to meet the most exacting conditions of temperatures, shaft speeds and other critical factors. Both types come in all sizes.

In leather *or* synthetic, National industrial oil seals protect your capital investment at low cost. So why take a chance on a used seal? Call your National Seal specialist for replacements!

NATIONAL OIL SEALS

FEDERAL-MOGUL SERVICE

DIVISION OF FEDERAL-MOGUL-BOWER BEARINGS, INC. • DETROIT 13, MICHIGAN



To produce finest quality appliances



Richard Powell, general manager, and Stanley R. Burns, works manager, of Whirlpool's Clyde, Ohio, plant in the customer test booth where Whirlpool automatic washers are quality proved prior to delivery.

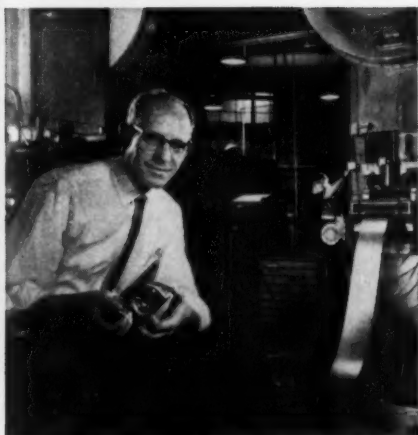
-Whirlpool begins with....

Quality Steels

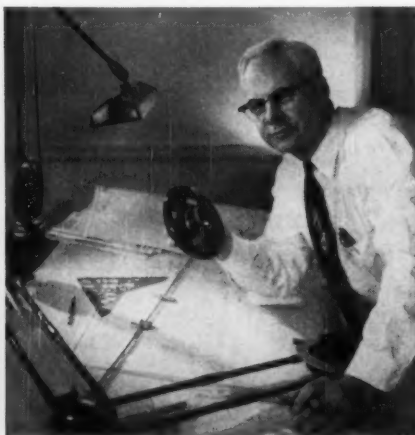
The name Whirlpool has always symbolized quality in the appliance market. To assure continuance of this desired position the Whirlpool Corporation is careful to demand the finest quality materials from their suppliers.

Recently, Whirlpool's Clyde, Ohio, plant named the Sharon Steel Corporation as "Supplier of the Month" for two months in succession. We here at Sharon are proud of this commendation for it stands as tangible evidence that our desire to work with and provide our customers with the finest steels and service the industry has to offer has gained recognition in an industry where service and quality are important.

Sharon service is complete service and Sharon Steels are the finest made.
Sharon Steel Corporation, Sharon, Pa.



"To keep Whirlpool first line requires first line steels—Sharon does this consistently"—Lester First, Director of Quality Control of Whirlpool's Clyde, Ohio, plant.



"When you design for quality, the steel is important—for this reason Sharon has become a trusted supplier"—Albert Coleman, Director of Engineering.



Richard S. Rice, Director of Purchasing, presents Sharon salesman Myron Kauffman with his second in succession "Supplier of the Month" award as steel buyer Raymond Celek looks on.

SHARON *Quality* **STEEL**

SHARONSTEEL



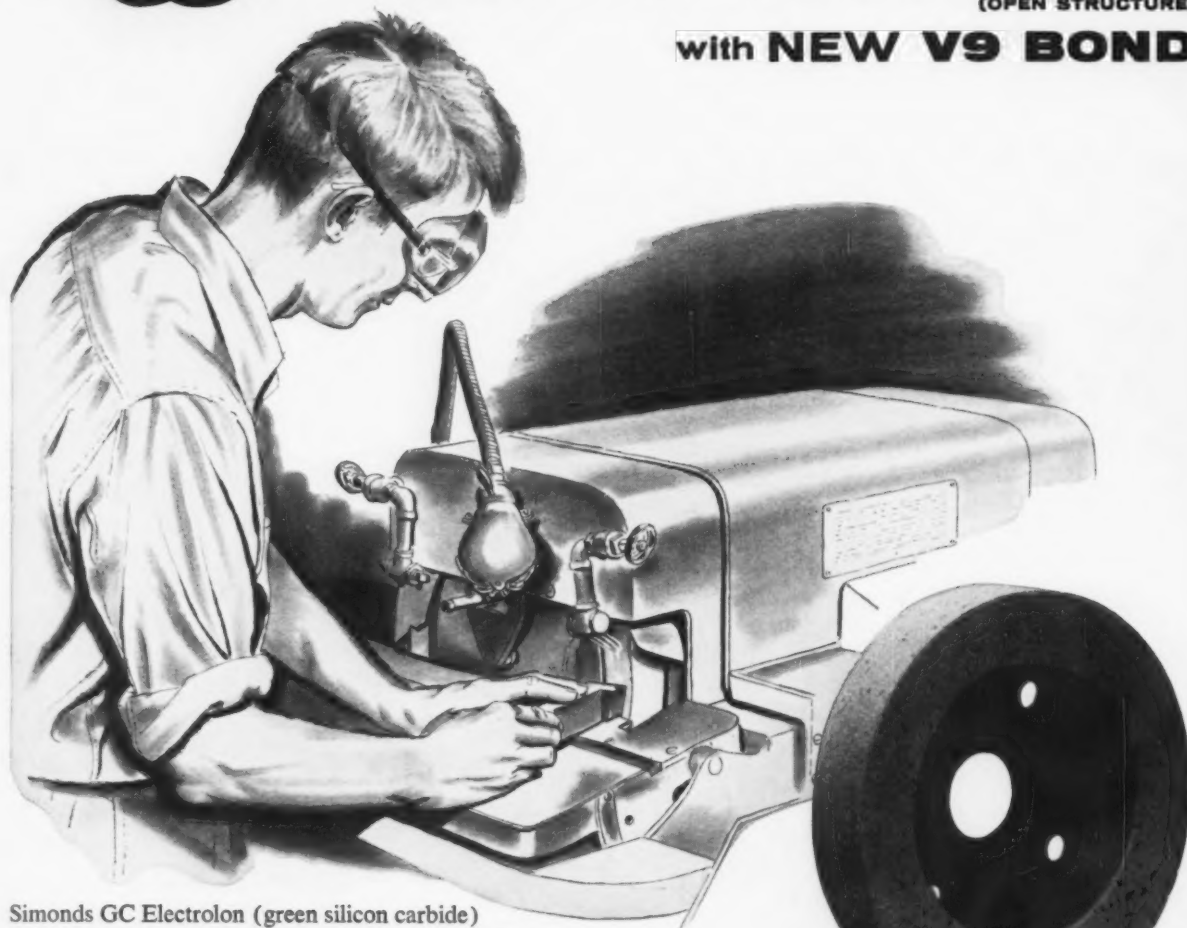
HALT

heat damage to carbide tipped tools

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Simonds GC Electroton (green silicon carbide) grinding wheels are made with very open structure by a new method to produce the desired voids or pore spaces . . . for cooler, faster grinding. The new V9 vitrified bond is a chemically designed glass bond more controllable for more uniform grinding action. Furnished plate-mounted for all grinders. Typical specifications for carbide tool grinding: GC60-H12-V9 for roughing; GC120-H12-V9 for finishing.



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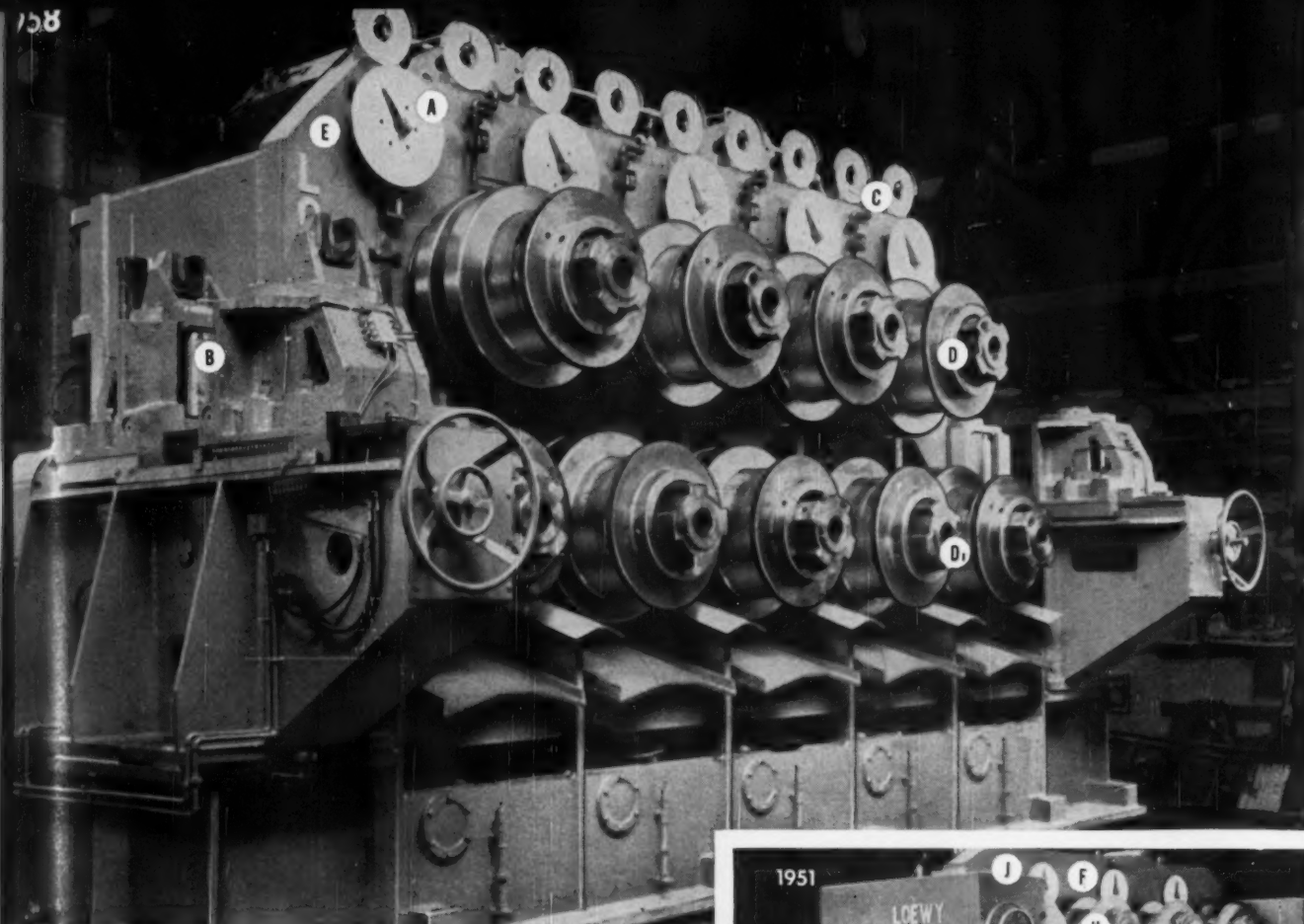
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Division of Simonds Saw and Steel Co.

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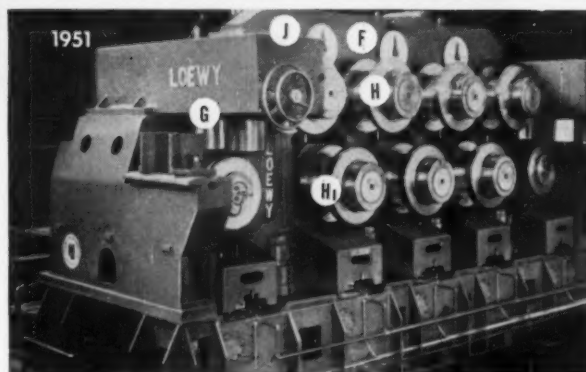




- A. Five indicators for vertical adjustment of horizontal rollers
- B. Vertical rollers supported on both ends and arranged on base-mounted sliding frame
- C. Nine indicators for lateral adjustment
- D, D1. Horizontal rollers bench-assembled on sleeves for quick change of program
- E. All-welded steel frame

Also noteworthy: lateral movements are power operated and vertical rolls are driven by separate motor

- F. Three indicators for vertical adjustment of lower horizontal rollers
- G. Vertical rollers overhung and mounted on overhung bracket
- H, H1. Horizontal rollers directly mounted in roller shafts
- J. Cast steel frame



Loewy roller-straighteners for structurals and rails feature one-pass straightening at 600 fpm

In 1951 Loewy-Hydropress designed and built America's first roller-straightener with overhung straightening rolls for heavy structurals and rails—the most important development ever made in the design of straightening machines. This one-man-operated Loewy-pioneered straightener beats the slow and cumbersome gag press, which depends entirely on the operator's skill. It outmodes the closed-type straightener, which is not nearly so accessible as the open-type Loewy, does not provide the horizontal adjustment for removing camber, and requires partial dismantling of the machine for every program change. Now we offer a machine incorporating features that further improve on the original overhung model of 1951 (see photo-

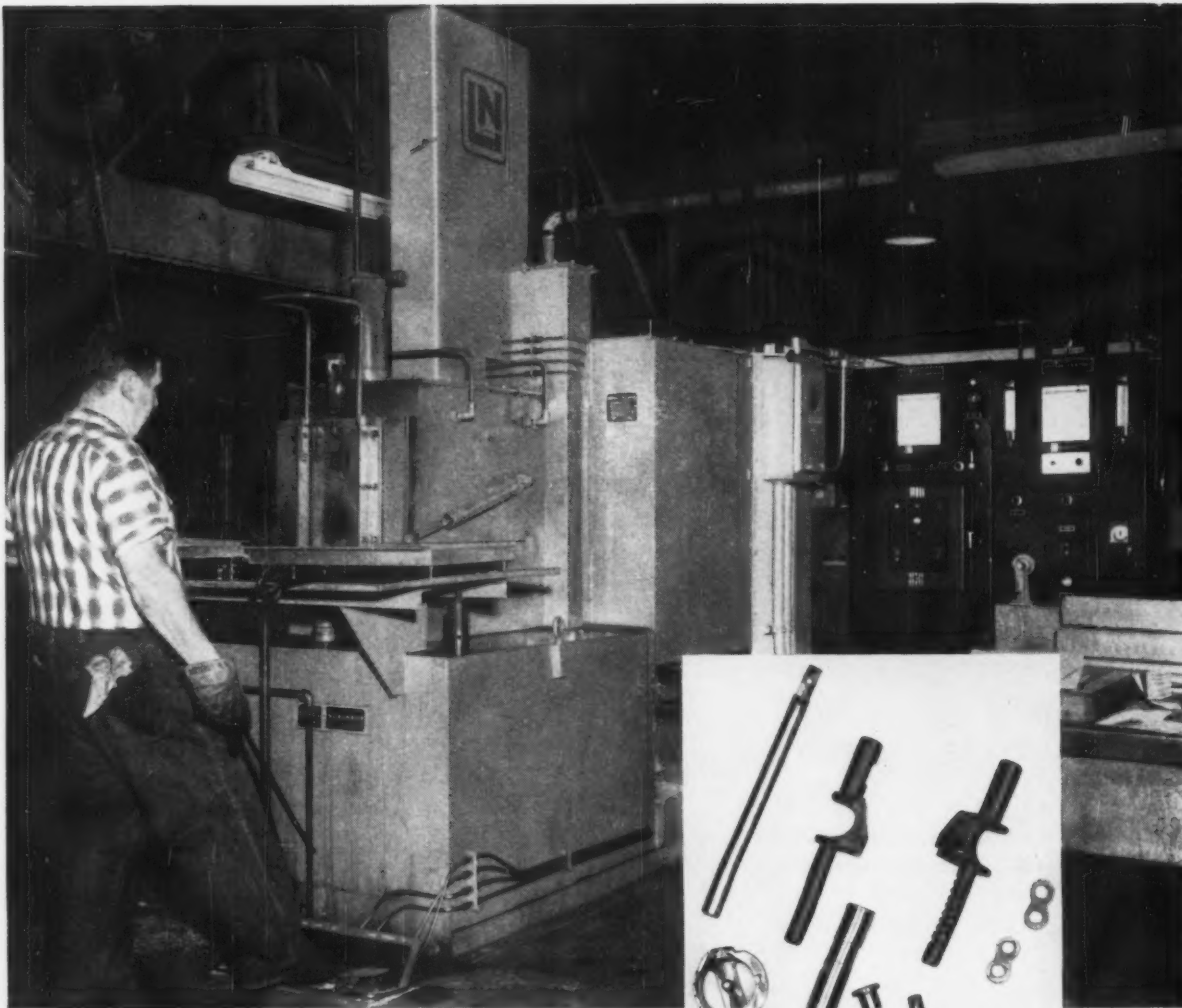
graphs above). Among the advantages are greater maximum speed—up to 600 fpm—and decrease of time required for changing rolls. By providing sleeve-mounted rolls, their assembly may be accomplished away from the machine, and thus the change of rolls can today be effected with a minimum delay for different rolling programs. Roll adjustments are now remote-control power operated and provided with selsyn-actuated indicators which show the various adjustments in the operator's booth as well as on the machine. Our machines achieve better than commercial straightness in one pass.

For more information on Loewy roller-straighteners for structural steel or on any other rolling equipment, write Dept. A-4.

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Typical carbonitrided parts

"Here at Singer we're not only saving money on cyanide salt . . .

but on handling costs formerly required to string up each part individually." So says the Heat-treat Manager of the Singer Manufacturing Company's plant at Elizabeth, N.J. where a new L&N Tricarb furnace was recently installed. "As yet," he says, "we can't give any exact cost figures. We've just been running parts and checking them through Quality Control. But we know our cost per part has really dropped."

At the present time, Singer is carbonitriding various sewing machine parts made of SAE 1010 to a case depth of 0.008" to 0.015" at 1550 F for $\frac{1}{2}$ to $\frac{3}{4}$ of an hour at temperature. The cycles are fast and the work comes out of the protected atmosphere quench clean and bright.

The Manager points out that, "Once these parts are okayed by Quality Control we plan to do case carburiz-

ing and homogeneous carburizing in the same furnace. With Microcarb control we can tell exactly what we're doing and where we are. We bought this furnace as part of a quality control and reduced cost program . . . it's the most precise heat-treating tool we could find on the market. It's a natural for handling the variety and caliber of work we have to turn out."

If you, like Singer, must heat-treat a myriad of parts . . . need versatility and precision control . . . it will pay you to investigate this Tricarb furnace. It is a complete heat-treating package with integral quench and direct and continuous temperature and carbon control. In just one furnace you can now do controlled surface carburizing, carbon restoration, hardening, homogeneous carburizing or carbonitriding.

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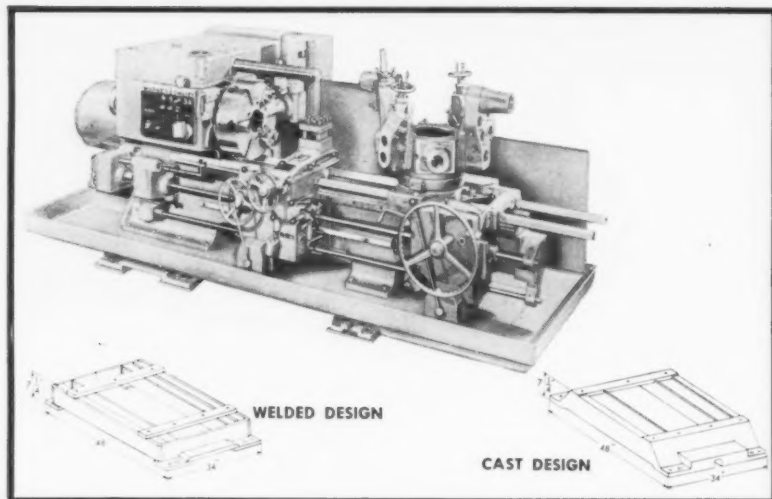
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WELDYNAMICS

NEWS ABOUT ARC WELDING AT WORK CUTTING COSTS



WELDED STEEL LATHE LEGS ELIMINATE BREAKAGE... REDUCE COSTS 49%

Cast head and foot legs on heavy duty turret lathes built by Warner and Swasey Company, Cleveland, Ohio, were being damaged occasionally by shipping mishaps. It was decided that they be strengthened. Normally this would have meant a 15 to 20% increase in casting costs not figuring pattern changes. At this point, fabricating the legs of formed, welded steel shapes was checked.

With steel design, it became possible to increase strength even though wall thickness was reduced. This reduction in wall size is possible because steel is stronger and more rigid than cast iron. Resultant savings in material weight, when added to savings in cost per pound of steel over cast iron amounted to 49% of the original cost of the cast legs. And when compared to the estimates

for the strengthened cast design, a cost saving closer to 60% was realized. The welded legs now have superior resistance to shock and impact loads encountered in shipping and implacing.

DESIGN IDEA SHEETS FREE TO ENGINEERS

Practical tips for achieving efficient welded designs are published regularly by The Lincoln Electric Company in "Design Ideas". They are sent free of charge to design engineers, executives and production supervisory personnel.

The "Procedure Handbook of Arc Welding Design and Practice" has 1100 pages and 1300 illustrations. 245 pages are devoted to machine design. Price is \$3.00 postpaid in the U.S.A., \$3.50 else-

where. Order from The Lincoln Electric Company, Box 3115, Cleveland 17, Ohio.

A new publication entitled "Arc Welding in Machinery Design and Manufacture" is a practical reference manual of ideas for the efficient use of steel in machine design. Order this book from the James F. Lincoln Arc Welding Foundation, Cleveland 17, Ohio. Price is \$2.00 in U.S.A., \$2.50 elsewhere, postpaid.

MACHINE DESIGN SEMINARS

Already attended by hundreds of design engineers, Lincoln Machine Design Seminars continue to be fully attended by designers interested in the latest information on welded design.

Conducted regularly at the Lincoln plant in Cleveland, Ohio, the seminars run for five days. During that time the "student" engineers learn new design techniques for achieving the most efficient designs for machinery and components. They witness demonstrations of latest welding processes and techniques.

"Alumni" of the Lincoln Seminars are enthusiastic in their commendation of these sessions for practicality and usefulness.

Engineers who desire to attend a Machine Design Seminar should write to R. Wilson, The Lincoln Electric Company, Cleveland 17, Ohio. Attendance is by reservation.

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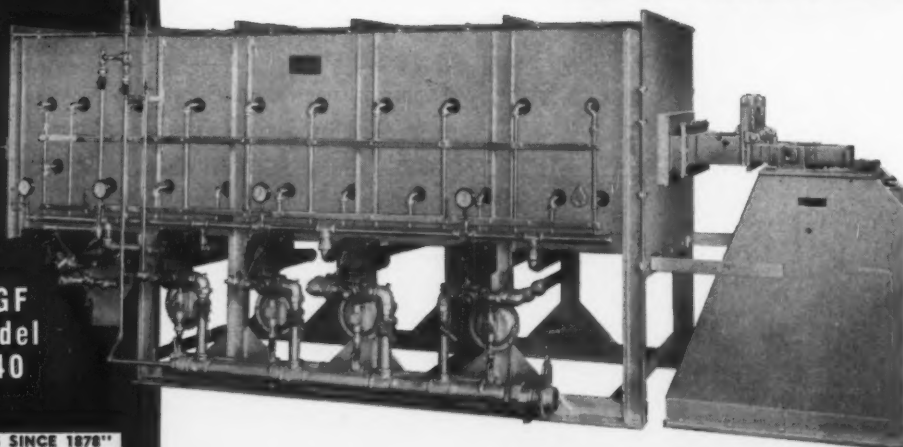


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Blaw-Knox designs and builds slabbing-blooming mills in a complete range of sizes in universal and high lift types. Other Blaw-Knox equipment for the metals industry includes complete rolling mill installations and auxiliary equipment for ferrous and non-

ferrous metals, iron, alloy iron and steel rolls, Blaw-Knox Medart cold finishing equipment, carbon and alloy steel castings, fabricated steel plate or composite design weldments, steel plant equipment, and heat and corrosion resisting alloy castings.



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Certainly you have to depend on your vendors...but how much?

The answer is "completely"! Your job is tough enough without your having to be a machine design or materials handling expert, too.

When you're specifying equipment, you should *only* have to provide an objective explanation of the problem, as well as the understanding of the product and related processes.

The vendor is the expert who's supposed to analyze that problem, then design and supply the necessary equipment. And the equipment should be ready to do your job when it's installed, too. Your overhead can't afford the lost production time and expense while you test and prove the vendor's equipment for him. After all, your original specifications called for equipment to do a particular job.

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the original specifications. That's why Sciaky resistance welding and production equipment satisfies the requirements of *your* particular job. That's why Sciaky operates the only independent, fully staffed and equipped Research Center devoted to advancing the application of resistance welding processes.

Why take less than the full advantage of consulting with a Sciaky Application Engineer the next time you are considering equipment. No obligation, of course.

The manufacturers of automobile wheels took that advantage. As a result those wheels are now assembled with automatic resistance welding that includes four other operations—not only assembled better, but faster and at lower cost. Write for the details of this unusual high production application that satisfies the most rigid specifications for weld quality.



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When you buy a custom-designed KING machine, you buy only the accessory equipment, electrical controls, and design modification which your special-work machining operation requires—*no more and no less!* And always, you have in the basic machine all the standard facilities for general-purpose boring, facing, and turning.

This KING combination of special features and general-purpose facilities makes *all the difference* in competitive cost-control.

**72" KING
Custom-Built
Vertical
Boring and
Turning Machine**

**134"
WORKING
HEIGHT
UNDER
RAIL**

**TYPICAL
PARTS**

**TEMPLATE
HOLDER**

**TYPICAL
TEMPLATES**

**ANGULAR PLACEMENT OF SIDE
HEAD RAM** permits the proper
positioning of grinder wheels
for tracer contouring and the
means for turning and
grinding angular surfaces.

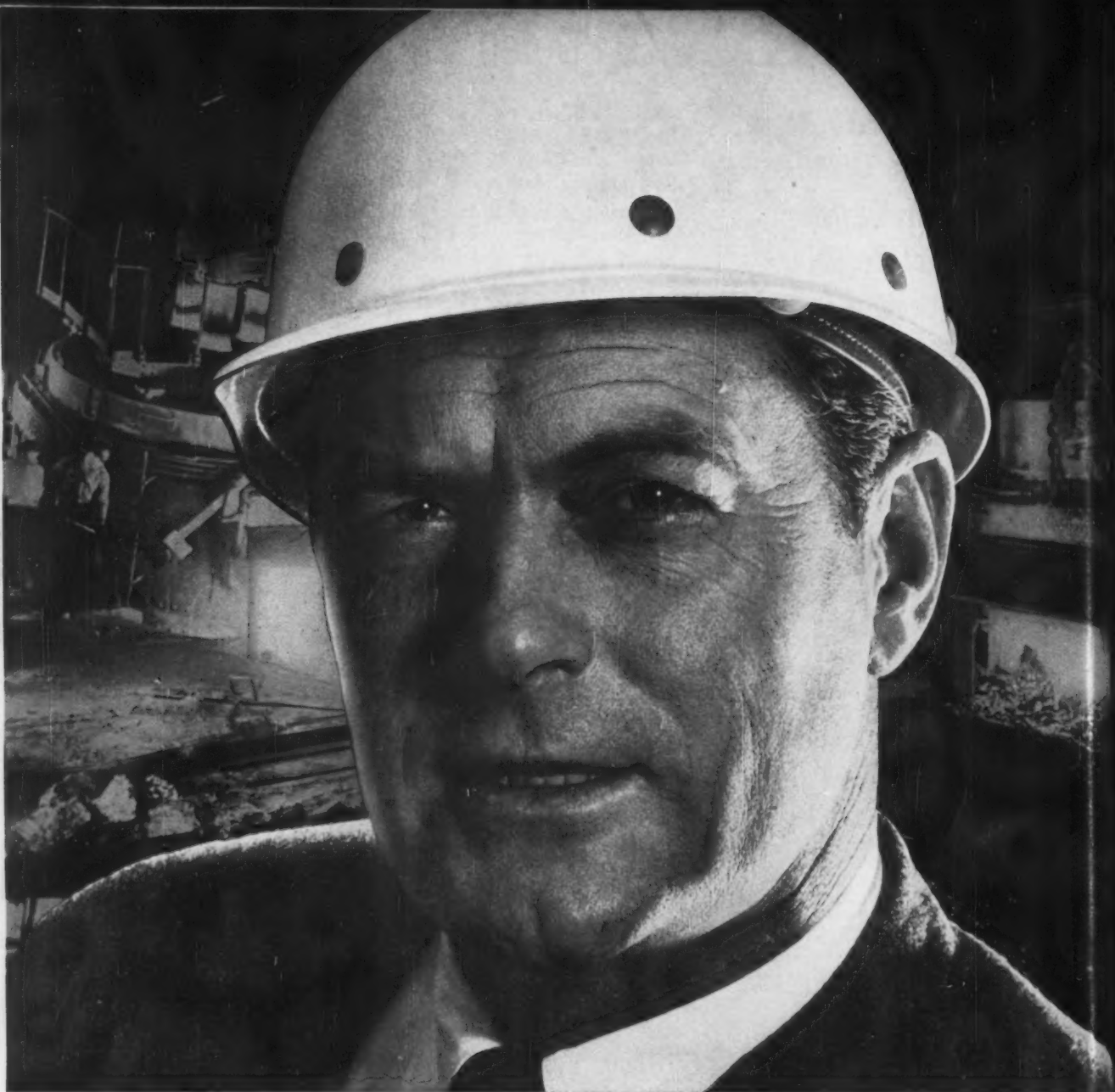
OTHER SPECIAL FEATURES OF THIS MACHINE

- ✓ Swiveling type side head arranged for tracer controlled turning and grinding operations.
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- ✓ Operator carrier platform attached to side head.
- ✓ Console control system.
- ✓ Electronic, two-dimensional (360°) tracer mounted on side head. Template holder arranged to support templates of the type required for work pieces utilizing full capacity of the machine. Universal adjustment is provided for the tracer head.
- ✓ Electronic, two-dimensional (360°) tracer mounted on rail head. Template holder mounted on top of rail to provide maximum work clearance above table. Positioning controls for stylus head for operator convenience.
- ✓ Constant surface cutting speed attachment and constant chip thickness controls applied to both tracer heads.
- ✓ Coolant conducted through rail head rams.

For further details on KING machines—standard 30" to 144" designs or special custom-built units—see your authorized KING Distributor, or write to us direct.

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KING Vertical Boring and Turning Machines



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Ferromanganese-silicon allows savings of as much as \$8 per ton, depending upon practice, in the production of high-manganese stainless steels. It also reduces manganese costs for the chromium-nickel grades of stainless.

The alloy is both an efficient slag reducing agent and the lowest-priced source of low-carbon manganese currently available. For details on cost reductions in your practice, contact your UNION CARBIDE METALS representative.

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Ferromanganese-silicon gives lower costs, rapid solubility, and high manganese recoveries.



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INDEPENDENT STAMPERS BELIEVE the "make or buy" battle may be about to turn in their favor. Their business volume is moving up to the 1957 level. And at least two big electronics companies are buying from independent stampers \$3 million in parts they had made in their own shops.

MAJOR METALPRODUCING INDUSTRIES are stepping up research, statistical and promotional efforts. Important announcements of new developments in these areas should come this summer. Most of the work will be done through existing trade organizations. But new groups may be formed to help push the programs.

IMPORTED SMALL CARS have been given a big tax break by Mexico. The government cut import taxes an average of 50 pct on many European economy models, plus six cylinder engine models of Studebaker's Lark and American Motors' Rambler. Duties on large-size U. S. cars were boosted.

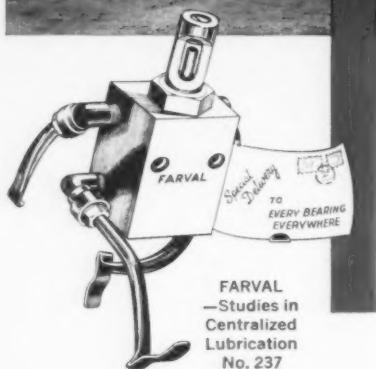
SMALL U. S. SHIPYARDS may be in for economic trouble. Two University of Michigan researchers say these companies rely on guesswork estimates based on experience. But when asked to bid on new types of craft they're unable to make sound bids.

NUMBER OF JOBLESS may remain fairly high for another 15 months. The Labor Dept. says an average of 2.1 million will draw jobless pay and 2 million more exhaust benefits each month in the new fiscal year beginning July 1. Reasons: Labor force grows faster than demand; output per worker continues to rise.

SOME 130 ELECTRIC UTILITIES are engaged in broad industry-wide atomic power development program involving more than \$500,000. The effort comprises 26 separate nuclear projects ranging from research to operation of plants already producing power.

TWO U. S. STEELMAKERS are reportedly considering installation of Stora-Kaldo oxygen steelmaking vessels. Many others are watching the process closely. Dravo Corp. now has the rights to construct, design, and sell the process in North and South America.

INDUSTRY'S EMPHASIS ON PACKAGING has given a new lease on life to makers of industrial incinerators. The problem of burning cartons and other industrial waste without creating a smoke nuisance is boosting sales. Sales jumped from \$8 million in 1955 to \$21 million last year, could reach \$25 to \$40 million in '59. The years ahead are expected to see further increases.



Farval lubrication protects over 100 vital bearings on J&L's Exciting, New Cold Mill

Bearing failure on J&L's new, up-to-the-minute 77-inch cold reduction mill could cause costly shutdowns—boost operating costs sky-high. So Jones & Laughlin engineers wisely specified an automatic cycle-controlled Farval lubricating system to keep their Cleveland Works mill—one of the fastest, heaviest, most powerful four-stand cold reducing mills of its type in the world—operating at top production rates.

Farval is no new comer to the Steel Industry. Over the last 30 years it's been busy protecting all types of mechanical equipment—keeping it in top-notch operating condition.

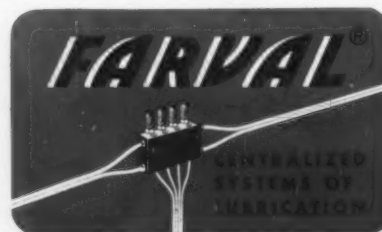
Write for your free copy of Bulletin 26-S. It gives all the facts about Farval and how this versatile system of automatic lubrication can provide uninterrupted, maintenance-free production in your plant. The Farval Corporation, 3282 East 80th Street, Cleveland 4, Ohio.

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*Affiliate of The Cleveland Worm & Gear Company
(Subsidiary of Eaton Manufacturing Company)*

↑↓ KEYS TO ADEQUATE LUBRICATION

Wherever you see the sign of Farval—familiar valve manifolds, dual lubricant lines and central pumping station—you know steel mill equipment is being properly lubricated.



Are Stampers Recovering Ground In "Make or Buy" Battle?

Industry's trend to integration in the early '50's hit independent stampers hard.

By education and hard selling, with an unexpected assist from the recession, trend may be halted.

■ In no industry has the "make or buy" battle been more hard fought than in metal stampings.

But most independent stampers, looking at new orders that should bring them up to the 1957 level, believe they have at least halted the "make" trend.

Others, pointing to users who have given up captive shops, or farmed out more business this year, believe they have regained much lost ground.

Millions for Vendors—In recent months, two major electronics manufacturers announced they would buy a total of \$3 million in parts they had manufactured in their own plants. A third is on the fence, deciding whether to throw an additional \$1 million in business to vendors. These are current examples.

C. C. Caditz, Northern Metal Products, Chicago (see cover), says: "Industry has reached the stage where it is no longer a slave to make. But now it must face the decision to change from make to buy."

New Trend—As recently as five years ago, there was little discussion of make or buy. The trend in most industries was out-and-out integration. With the auto industry as a leading example, stampers saw many of their markets disappear, some of them forever.

About that time, some of the

leaders in the field determined to reverse the trend toward more captive shops.

Says Carter C. Higgins, president of Worcester Pressed Steel Co.: "We made an effort to find out what factors determined the make or buy decision. We told the story in the trade press, spoke to groups like the National Association of Purchasing Agents.

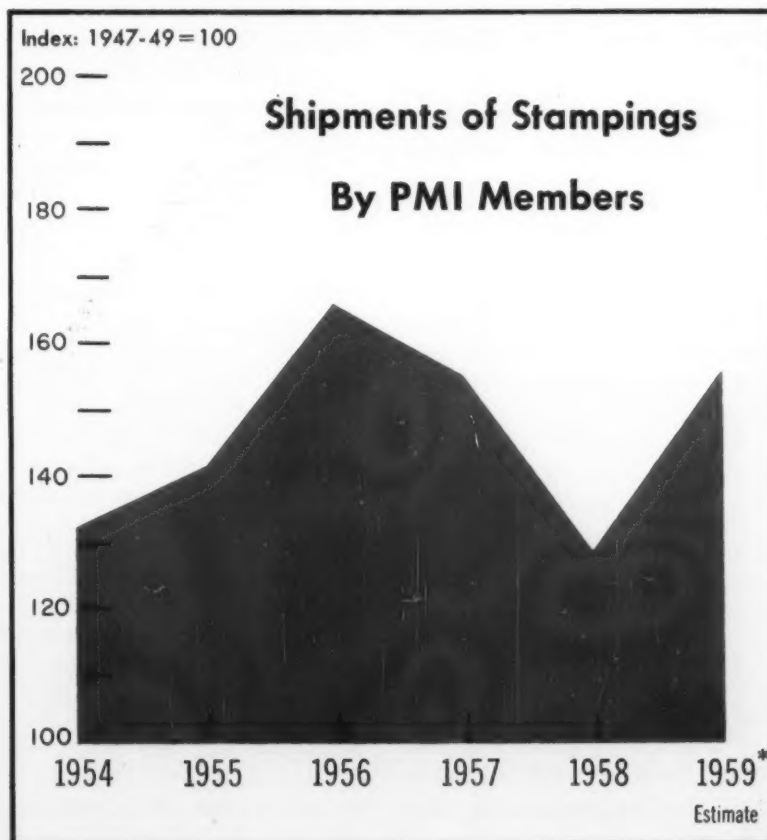
New Approach—"This was the broad approach, but it established

the question of whether automatically making the stamping was a wise policy."

He recalls that, a few years ago, a typical stamping salesman "just gave up" when informed a company was planning to pull stamping operations into its own plant.

"Now, if a report is received that a company is pulling back, people higher up, like the company president, will make an attempt to find out why. This has brought us into more personal contact with the com-

Can Stampers Bounce Back?



How to Reach Make or Buy Decision

Reasons to Make

1. Studies show it's cheaper to make.
2. Making fits your know-how and equipment.
3. Idle capacity available.
4. Direct supervision needed for control.
5. To control parts changes, inventories and deliveries.
6. Part is hard to transport.
7. May be confidential.
8. To avoid dependency on a single outside source.

Reasons to Buy

1. Studies show it's cheaper to buy.
2. Facilities not available.
3. Investment not attractive.
4. To avoid seasonal demands.
5. To obtain techniques or facilities needed.
6. You want to concentrate on your specialty.
7. To check on your own operations.
8. To maintain supplier relationships.

Source: Carter C. Higgins, President, Worcester Pressed Steel Co.

panies we supply, and with some progress."

Are Companies Prejudiced?—Mr. Higgins believes that, overall, there has been a reduction in the number of companies that rely on their own captive stamping plants. But because of the tremendous volume lost to the auto industry, which has no intention of reversing, total volume won't show the same gain.

"Too many plants have a built-in prejudice in make or buy," he says. "This is because the decisions have been made in areas where the individual who makes the decision is affected."

He cites a major electronics company which is buying more stampings than previously, primarily because of an internal reorganization which put the decision away from the manufacturing group to an all-company committee.

Selling Points—What do stampers have to sell management in the make or buy decision? Here are some general points that most stampers now can argue articulately:

1. They are specialists in their field.

2. They can afford a wider variety of equipment than a smaller captive shop, which makes them more versatile and able to deliver.

3. Stamping is highly competitive, has the capacity to handle peaks of demand without affecting buyer's overhead.

4. Frequently labor rates are lower than the buyer's industry pattern.

5. They carry the inventory.

Recession Trend—Some stampers were surprised that the 1958 recession resulted in comparatively fewer stamping operations brought into the home plant than in 1954.

"The recession started the trend toward a more serious evaluation of stamping operations, as well as allied fields like welding, heat treating and castings," says Harold A. Dasher, managing director of Pressed Metal Institute.

"Many captive operations didn't stand up under their first real close scrutiny. Some have been lumped with other departments or products. Many had not been looked into closely since they were originally set up and the original evaluation didn't hold up in the light of experience."

Tight Money—With money extremely tight in the last two years, financial committees tended to oppose additional make decisions, unless the equipment was idle, and cost studies proved conclusively that the move was justified.

One stamper reports it has received assists in holding its business from two unexpected sources, banks and management consultants.

While this conclusion may be debated, his opinion was that management consultants are leaning to outside sources for greater flexibility and freeing of capital.

Under the uncertain business conditions of 1958, banks hesitated to finance inventories or other facilities needed to launch captive operations.

Total Costs — Stampers believe that in decisions to make, rather than buy, total costs are seldom figured.

"Our principal effort has been to encourage an unprejudiced decision," one stamper says. "Anyone who makes a decision on anything other than total cost, and what will give him the best profit, is kidding himself."

"The greatest error is failure to

recognize overhead," he contends. "Users frequently allow only partial overhead, but an inside stamping operation has all the overhead of an outside source, except selling, profits and shipping."

Other Side—On the other side of the fence, a spokesman for a large appliance and electronic company reports his company's policy is to make all it can. Part of this is desire to use existing facilities.

He points out that early TV sets had up to \$5 in stampings in each set; today's from \$2 to \$3.

"To keep our facilities in operation, we went into the cabinet business," he reports, "and we are still making \$4 to \$5 worth of stampings for each set." His company has been bringing in more work, will go outside at peak of volume or for a control on its own operations.

"Even if we make 95 pct of our own stampings, we send every part out for quotes. It's a must."

Still Flexible—But his company is still flexible, will go outside if it can't do it cheaper and better. Then too, it protects itself with suppliers in case of an explosive demand which makes home facilities inadequate.

To the purchasing firm, here are some fundamentals to keep in mind:

First, there is no clean-cut formula. Each part must be measured individually.

If there is any doubt, send inquiries to several jobbers. In this competitive area, plants may be willing to operate on a small profit compared with the user.

It's a rule of thumb that the smaller the run, the more likelihood that it will be more economic to job it out.

The vendor is a specialist in cost reduction on tough jobs.

Reprints of this article are available as long as the supply lasts. You may obtain a copy from Reader Service Dept., The IRON AGE, Chestnut & 56th Sts., Philadelphia 39, Pa.

Buyer Headaches

Small Plant Has Special Problems

■ Purchasing for small-sized companies creates both tough problems and great opportunities.

That was the conclusion of a panel discussion at the April meeting of the Purchasing Agents' Association of Philadelphia. The topic: "What Are the Purchasing Problems in a Small Company?"

Causes for Concern—Leading the forum was Bernard B. Joseph, The Philadelphia Bindery, Inc., with aid from panelists Louis M. Eble, Jr., C & D Batteries, Inc., and Harold W. Bonekat, Conoflow Corp. But many questions—and some answers—came from the audience.

Here are some of the main causes of concern for a small company purchaser and what can be done about them:

Building Status: This is a tough problem, especially if the purchas-

ing function is a newly created job. Other department heads who formerly did their own buying may be resentful of the change. Management may keep for itself the purchasing of capital equipment, speculative buying, and make or buy decisions.

Solutions: With management the purchaser must continually stress his decision-making ability. He does this by proving purchasing's value to operations and sales.

Internal Relations: There are several effective ways to counteract jealousy and lack of cooperation from other departments. First, find out all you can about how other managers operate, get to know their problems. Second, be overly cooperative yourself. Third, give others ideas, then praise their originality and foresight.

How to Get Good Sales Service

Small companies usually place smaller orders, buy less frequently than larger companies. So salesmen may court the bigger buyers, spend more time with them.

Yet the purchaser in a small-sized company wants the same sales attention, quality product, and good delivery. How can he get it?

Here are some suggestions made at the Philadelphia purchasing forum:

Sell the Salesman: Point out your 20-unit orders are just as important to you as orders for 20,000 units are to larger buyers. Convince him your company is growing.

Orders will get larger, eventually include more items.

Keep Salesman Eager:

Stress fact that the salesman has an account he can rely on. Remind him good performance will bring repeat orders.

Don't Be a Nuisance:

Avoid excessive "phone-itis" in tracing orders, asking about delayed shipments. Save personal contact until there's a real need for you to take action. Leave routine checking to your secretary or clerk. This will make your own calls or letters more important, assure them of more attention.

Oxygen Steel Goes Competitive

Dravo Gets Rights to Sell Swedish Process

American mills have been studying the Stora-Kaldo process of oxygen steelmaking for several years.

Now Dravo Corp. has obtained rights to design, construct, and sell the vessels in the U. S.—By G. J. McManus.

More excitement about oxygen steelmaking broke loose last week.

It came with word that Dravo Corp. had secured rights to sell, design, and construct Stora-Kaldo oxygen vessels in North and South America. Already two American mills are reported considering installations. And many others are watching the process closely.

Intense Interest—Even before these developments, interest in oxygen steelmaking was close to the boiling point. Packed meetings of steel men have been getting reports

on oxygen vessels. Detailed studies have been made for most mills.

Dravo's agreement is with Stora Kopparberg Corp., the Swedish steelmaking firm which developed the Kaldo process and which operates the vessel now in use.

Know-How Included—Under the new arrangement the license fee for the Kaldo process along with full "know-how" will be included in the charge made by Dravo for construction of facilities. No running royalty will apply.

Until now all eight oxygen vessels built in this country have been the LD type, developed in Austria and marketed here by Kaiser Engineers.

Two 110-ton Stora-Kaldo vessels are due for completion in Sweden by the fall of 1960. Three 110-ton vessels for France are expected to be completed by April of next year.

Swedish Study—At the moment Dravo must draw its operating data from the furnace built at Domnarfvet, Sweden, in 1954 and first reported in this country by IRON AGE Editor-in-Chief Tom Campbell (The IRON AGE, Oct. 18, 1956.)

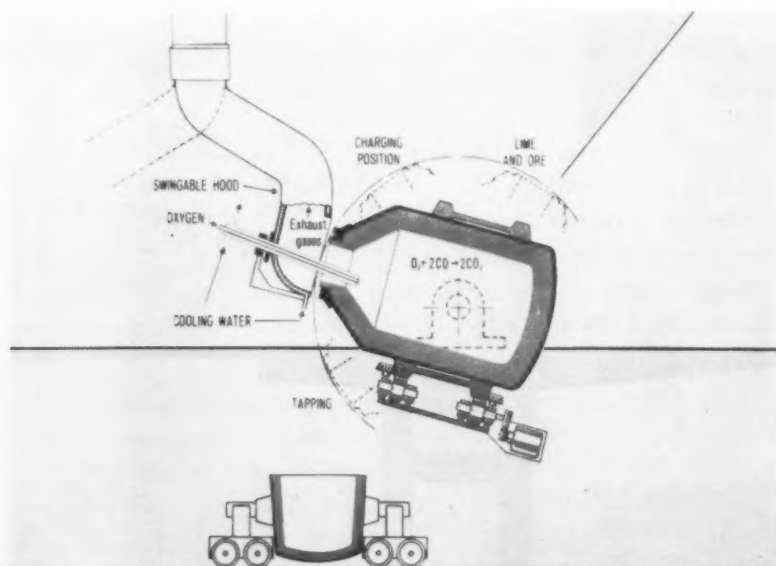
The Domnarfvet vessel has a capacity of 30 tons. It is not normally charged with scrap. Iron used is a high phosphorous Swedish type. Refractory practice does not provide a good measure of the lining life that could be expected here.

Operating Estimates—In the area of general advantages, Dravo offers figures to show low capital costs, low operating costs, and high steel quality. The company estimates a complete new shop with Stora-Kaldo vessels could be built for 50 to 65 pct less than an openhearth shop with the same capacity.

In a situation where vessels are to be installed in existing openhearth buildings, the cost is placed at less than \$8 per annual ingot ton for a layout with capacity of 1 million tons a year. Height is no problem in the use of existing shops, says Dravo.

Operating Costs of Stora-Kaldo vessels run \$5 to \$10 under those of openhearths, says Dravo. In the case of some older shops, it is estimated the vessels would save enough to pay for themselves in a year.

Benefits Listed—Two of the most critical advantages named for the process are heat economy and control. In the process, the extra heat produced by full oxidation of carbon makes it possible to melt relatively large quantities of scrap. The furnace at Domnarfvet has been charged with just under 40 pct scrap.



SWEDISH STEELMAKING: So far operating data on the Stora-Kaldo oxygen process has come from 30-ton furnace built at Domnarfvet, Sweden. But plans are under study to provide a complete plant in the U. S.



THE LOOKING GLASS: Radiation shielding window, made by Corning Glass, is 8½ ft thick, weighs 9 tons.

Keep an Eye on Nuclear Power

It's a steadily growing market for metalworking.

Here are some of the biggest advances shown at the Nuclear Congress.—By T. M. Rohan.

■ Peaceful use of atomic power is a steadily growing, multi-million dollar market for metalworking. Technology is still pretty specialized, but advancing to where standard commercial equipment can be used.

The fifth annual Nuclear Congress in Cleveland last week was the biggest ever, with 20 pct more exhibit space than last year. About half of the 3500 who attended were scientists, the rest came from industry.

Biggest Use—Nuclear power plants rate as the biggest immediate peaceful use of atomic power. There are now \$300 million worth under construction. Observers say the future of this field will be charted only after these pioneer units are studied and judged.

Main use of radioactive materials in metalworking is as tracer elements to check wear, and for radiographic-type inspection.

Exhibitors showed a big selection of instrument equipment, reactor metal components, remote handling equipment, detection, shielding and protection.

Major Exhibitor — U. S. Steel products exhibited cut across the whole company. National Tube Div. showed its stainless tubing. Forging plants are, among the few capable of turning out heavy walled reactor components of carbon, alloy and stainless for pressure vessels, pumps, motors and other equipment. Consolidated-Western designs and builds reactor systems. American Bridge makes structural parts. And heavy research is done on radiation, vacuum melting and similar operations to meet tight specifications.

Martin Co., of Baltimore, is developing an operational nuclear powered seaplane, the British Saunders Roe Princess. It also has a Strontium 90 generator which will turn out 100 watts of electric power for 10 years. It has no moving parts, ideal for remote, unattended operations.

Another — Pacific Coast Engineering Co., Alameda, Calif.,

backed into nuclear plant work 10 years ago when shipbuilding dropped off. Now about 20 pct of its work is in the nuclear field. It rolls plate to 6 in. thick for reactor parts. It has now participated in every major AEC project in the last 10 years.

Harvey Aluminum, Torrance, Calif., is extruded and forging zirconium, titanium and aluminum for nuclear work.

Europe Looks Ripe—The European market for atomic components is a good one, could hit a \$1 billion per year by the 1970's if only half the projected market potentials turn into actual sales, according to Karl F. Mayer of ACF Industries.

European enthusiasm is now cool because they have surplus of coal, and huge petroleum and natural gas reserves have been turned up in France and the Sahara. But the Euratom project calls for installation of one million kilowatts of nuclear power in six European nations.

Indications are U. S. aid will be mostly in engineering with components made locally at lower labor costs.

Behind Steel Labor Maneuvers

Eisenhower's Intervention Clouds Hope for Peace

Here are the facts in the touchy steel labor hassle.

Ike's statements have put both sides on the spot, but steel management seems to be getting the worst of it. — By Tom Campbell.

■ If you want to keep on the beam as the steel labor hassle builds up steam, skip the window dressing. Also, take with a grain of salt talk of outright White House interference—other than what you have already seen.

Both sides are warming up for the big fight. Both need support. Both can't have it all. The one who fails to get substantial public support may be in for trouble. If labor goes whole hog and wrings a big wage deal, prices will have to go up. If they do go up, steel firms will be over the barrel with the Government; but so will labor.

Ike Upsets Applegate—The President's entrance into the labor hassle

1959's Union-Management Crisis

at this early date has greatly complicated the natural complexities of collective bargaining. Neither side wants to give the impression that it is disappointed with what the President has said. But privately both steel management and steel labor are unhappy about it.

The President's intervention has made it necessary for both sides to retire to their corners and look over, change, and make more specific the parts that must be played up to the end of June, when labor contracts expire. Ike's statements appear to make a steel strike almost certain.

Mills on the Spot—It was bad

enough for the steel firms to have Senator Kefauver around their necks on steel prices. Now that President Eisenhower appears to be in the same corner with the Senator, things look tough for steel management. If it so much as suggests a settlement that will require a steel price increase, it is a dead duck with Ike and with the public.

While many observers claim that Dave McDonald was put on the spot by the President, it must be admitted that steel prices specifically were mentioned: Labor was not. And it was only inferred that "both sides" should use statesmanship. That is, Dave was not told by the President that he should ask for such and such kind of raise. He had been admonished indirectly by Ike several weeks earlier to ask for no more than a productivity raise. But since no one in or out of Washington knows or agrees what a productivity raise is, that issue will stir up more than it will settle.

Who Defines "Productivity"?—

At no time has any steel firm either publicly or privately agreed that if Mr. McDonald asks for nothing but a productivity raise it would give him one—and not increase prices. That couldn't possibly be done because there is no agreement between labor and management as to just what productivity is—or whose it is. Naturally the union would argue that productivity was high and thus a wage increase should be big. Steel management is opposed to any quick answers on what productivity is, hence it could not agree ahead of time to such a raise with no price increase.

What has happened—and it is a serious blow to free collective bargaining—is that steel firms are in a box; and so is the union. The idea that in peacetime the White House

What Union Will Ask For

Union Strategy—At its meeting in New York this week, the United Steelworkers' International Executive Board decided on this bargaining strategy:

1. It will ask for higher wages and improved fringe benefits.
2. It will insist on retaining the cost-of-living clause under which wages rise or fall under a formula based on the Dept. of Labor cost-of-living index.
3. It will argue that the steel companies can grant higher wages and fringes without raising prices.

The Board also offered to move up the start of negotiations from the presently-scheduled May 18 to May 4, and continue without recess to a settlement.

Steel Profits Cited—The union took another swipe at steel company profits with an assertion that its demands for contract improvements will be justified on the basis of increased output per man-hour, and industry profits.

The Board said the industry would still have a "reasonable" profit without a price boost.

can "negotiate" a steel wage increase with no chance of a price increase has startled advocates of free enterprise.

A Weird Situation—Not only has the Administration entered the fight to try to get a small raise and no steel price increase but it has added more reasons why there will be a strike. And if there is a strike—which would result from steel firms taking a firm stand against inflationary trends—the Administration will be attempting to force a settlement when and if conditions get to the emergency stage. This, steel people say privately, is "heads I win, tails you lose." It is no wonder that this year's steel labor hassle shapes up as the weirdest in years.

It may look as if Dave McDonald is in the clear but he is definitely not. With unemployment high and with a lot of steelworkers jobless, he will have to give long thought before calling a strike. Yet if he extends the contract deadline he will open the door for all steel users who haven't enough strike-hedge steel to call for more steel while the mills are open. Dave also has internal troubles which, although not as serious as generally believed, would be aggravated by a long strike. However, there is little chance that Mr. McDonald will change his personality so much that we will see him agreeing to take a non-inflationary wage boost. To him the steelworkers' wage increases have not been inflationary.

Management Is Firm—There are some steel users who think that all the lather about the steel industry's stand against an inflationary wage demand is only for public consumption. And there are a few steel people who think that nothing much can be done about holding back inflationary raises. But despite these minority views there is enough evidence to indicate that Dave McDonald and some steel customers are greatly underestimating the beating steel firms are ready to take this year for a basic principle.

Let's Face Facts In the Steel Labor Crisis

■ When all the noise has subsided, steel labor and management will still have to sit down and negotiate a collective bargaining agreement.

That basic fact seems to have been lost sight of in the furore created by newspaper advertisements and public statements, not to mention the Government's apparent attempt to dictate a settlement that will somehow make everybody happy.

There's been more pre-negotiation maneuvering than usual this year simply because both sides find themselves caught in the middle of the "anti-inflation" drive. Neither side wants to be blamed for starting a new round of price increases.

So management takes the position that the only way to combat inflation is to hold wages where they are and thus avoid price increases. Labor says the steel companies can do both—raise wages and hold the line on prices.

The Government, and some Senators, seem to be intent on intimidating labor and management into a "statesmanlike" agreement that will give labor a modest wage increase that will not necessitate a compensating price boost.

That's a good trick—if it can be done.

But oldtimers on the steel labor scene are beginning to wonder who is going to decide what is a "statesmanlike" contract and what is not. And whether one side is expected to be more "statesmanlike" than the other.

Senatorial thinking on the subject probably will come to light next week at the scheduled hear-

ings before Sen. Estes Kefauver's Antimonopoly Committee.

The union is scheduled to present its case April 22, with Roger Blough, chairman of U. S. Steel Corp., to follow two days later.

Whether the hearings will change anybody's mind on the basic issues confronting management and labor is problematical. But they will serve as a sounding board for the arguments that both sides have been advancing in their wooing of public opinion.

Last week's exchange between 12 major steel companies and David J. McDonald, president of the United Steelworkers, demonstrated once again that a new contract to replace the one expiring on June 30 will be negotiated only after the usual hard bargaining — and a possible strike.

The steel companies proposed to the union that the existing agreement be extended for one year without change in wages and fringe benefits. They also called for elimination of the cost-of-living clause in the present agreement. They said the extension would help to combat inflation, unemployment, and the competition of foreign steel-makers.

Mr. McDonald rejected the proposal "out of hand." He said his International Executive Board and Wage Policy Committee will still have to decide on bargaining strategy. He said he wants to go ahead with "normal" collective bargaining.

So it was a stand-off.

It looks as though there has been no basic change in the steel labor relations picture.

Men Behind the Couch Sound Off

What do industrial psychologists think about management's executive selection policies? These quotes are extracted from the new book "Executive Selection: How Psychologists Can Help" prepared by Harvard University Graduate School of Business Administration, and published by Management Reports, Cambridge, Mass.

"A nation of 66 million employed generally means a nation of four million managers. If these man-

agers earn an average of \$10,000 a year, industry is investing \$40 billion a year on its managerial talent alone. . . . Sound selection of such men is imperative."

"Everyone in this company who makes more than \$12,000 is considered an executive. Below that line, they're still in the formative stage. Above it, they run the company."

"Over that same period (the last five years), the number of psychol-

ogists employed in private industry has increased from 600 to 850 and the number engaged in providing consulting services to business has increased from 200 to 350."

"The importance of executive capacity is recognized by every firm in this country. Yet there doesn't seem to be significant emphasis on selection, which should be thought of as the first and most important step in management development."

Can You Pick Your Replacement?

Careful selection of executives is one way to reduce risk of business failure.

Here are some pointers on choosing the best management material.—By K. W. Bennett.

How good is the man who will fill your shoes?

Ralph Cordiner of General Electric suggested in 1950 that a management team should consist of three lines of defense. A second team, averaging 10 years younger than the first-line management team, must be training to step up. Behind the second line, a third line 10 years younger.

Too Short Range?—In practice however, most personnel specialists feel the second line today averages only 2-3 years younger than the top company officers it must replace. According to C. Wilson Randle of Booz, Allen & Hamilton, in an unpublished 1956 survey, over 50 pct of U. S. top management is in the 50-56 age bracket—ready for retirement in 10 years or less. A sprinkling of major companies have

picked out potential executive material in their lower ranks for jobs they will fill 3-5 years from now. In one case, a firm is attempting to spot men 10 years before they'll be needed in the first rank. But the majority, consultants feel, plan less than three years ahead.

Interest Revives—Personnel men find executive selection programs already rebounding from the 1958 slump. First indicator is an increasing number of "management audits." These assess top company jobs and the skills and personalities required to fill them.

The job becomes one of winnowing potential candidates, to make the most accurate choice, at least possible cost.

Several Ways Open—The most frequently-used methods of selecting executives are through a company psychologist, a consulting psychologist, or a personnel consultant.

Some companies believe it is best to call in a consulting psychologist. But a considerable number of U. S. firms maintain staff psychologists. One company with a staff psychol-

ogist estimates its cost for testing management level people at \$16 per person.

A consulting psychologist may charge \$75-\$125 per person tested. This isn't a continuing cost, however, and company management often screens the men to be tested down to three or four.

A rule of thumb: A sum equivalent to 1 to 2 pct of the salary of your executive group can be spent gainfully each year for executive development and selection.

The Final Choice—Does executive selection pay off? About 85 pct of business failures can be traced to executive deficiencies, according to one study. One consultant reports he was able to increase a company's accuracy in picking sales executives from four failures in 10 to two failures in 10—a 20 pct gain in efficiency.

Awarding the job is still top management's responsibility. But the need to have the right man available and trained when the time comes is boosting executive selection programs in U. S. industry.

Incinerator Sales Come to Life

New Waste Disposal Problems Create Willing Buyers

How and where to dispose of its refuse is becoming a nagging problem for industry.

It puts the relatively small commercial incinerator industry on the threshold of a new era.

—By R. O. Schulin.

■ Incinerator makers are tackling the growing problems of industrial waste disposal with the vigor of a young expanding industry.

In the Midwest, a large metal-working company is planning to install three in-line incinerators to burn off excess paint that clogs conveyor hooks on its paint dip line.

A company which had no way to get rid of its liquid byproduct found it could dispose of the liquid with an incinerator.

A dump operator in a large eastern city is installing a big municipal-type incinerator to substitute for his rapidly-filling dump site. It is expected to be the first private incinerator operation in the country.

Bigger Each Year—These are a few examples of why incinerator sales have jumped from \$8 million in 1955 to \$21 million last year. Sales in 1959 could reach anywhere from \$25 million to \$40 million, the Incinerator Institute of America estimates.

The years ahead are expected to be even bigger as the quantity of production wastes increases, as packaging materials use grows, as dumping sites disappear from metropolitan areas, and as local ordinances clamp down on air and stream pollution.

Plant Layout a Factor—Changing plant architecture is also having effect on the industry. One incinerator maker, McNaulin, Inc. of Milwaukee, reports growing interest

in multiple incinerator installations, especially in modern one-story plants that cover a wide area.

"Placing of several small incinerators at strategic points in the plant speeds up waste disposal, cuts down collection costs, reduces congestion in aisles, and makes for better housekeeping," explains M. A. Naulin, president of the Milwaukee company.

What You Burn — While well-packaged material coming into a plant reduces breakage and speeds up handling, once the packaging is removed it becomes a problem, says Mr. Naulin. It's more than just a matter of calling a janitor and having the refuse burned in a drum in the back yard.

Smoke nuisance and air pollution ordinances have to be taken into consideration. And many new packaging materials, especially plastics, can develop heat as high

as 16,000 BTU's per lb of refuse. It creates a fire hazard. An inadequate incinerator can be burned out in a short time.

The situation has put more importance on properly-designed incinerators.

Cost Consideration — A conventional, double-chamber, smokeless and odorless incinerator costs about \$10 per lb of rated capacity, e.g., a unit that burns 400 lb of refuse an hour costs about \$4000. But chimney costs may be extra, if you do not have an adequate chimney to tie into.

Of the dozen or so larger incinerator makers, most have standard models available, but all will design and build units for special purposes.

As a buyer of materials, the incinerator industry consumes mostly refractories and steel. About 20 pct of an incinerator's cost is steel, the remainder refractories, controls, and other parts.



EASY DISPOSAL: Refuse at Evinrude Motors plant in Milwaukee is tossed into a 400-lb-per-hour capacity Vulcanor Destructor incinerator made by McNaulin, Inc. A gas-fired unit, it is smokeless, odorless.

Aluminum Forgings

They're on the Road Back

■ Aluminum forgers are facing the future with heads bruised but unbowed.

They've been watching their business disintegrating for about the last five years. Shipments fell from 113 million lb in 1953, to 50 million lb last year.

Need More Markets—The industry has known all along what the problem is. About 90 pct of its sales, traditionally, are for defense uses, and most of this for aircraft. The steady drop in military aircraft spending has knocked the props from under the forging business.

Now the industry feels it has some answers, and it is ready to dig in its heels and hold.

Selling Points — Aluminum forgers hope to hammer their way to new markets on 1) Superior strength to weight ratio, 2) Sharp price cuts in the last four years which have made aluminum forg-

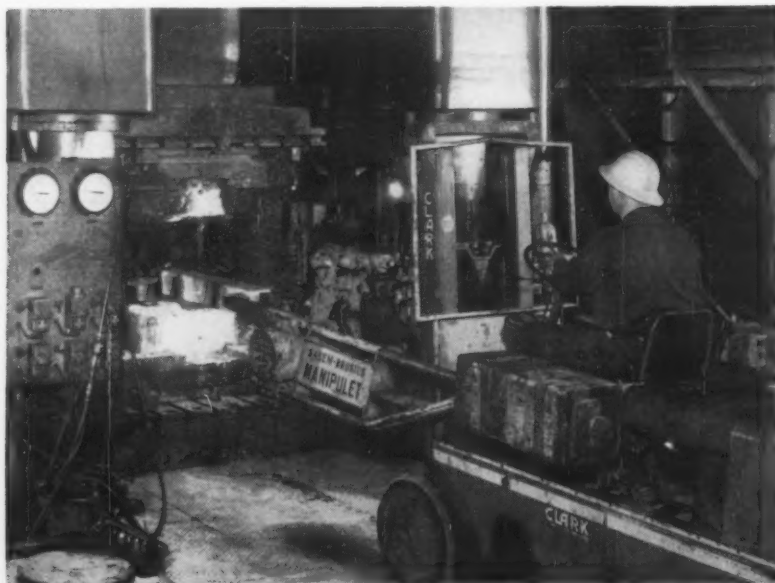
ings more competitive in cost with malleable iron and alloy steel castings, and steel forgings, and 3) new equipment and techniques which have improved quality.

Outlook: They'll hold the 1959 sales line at 50 million lb and start moving back up from there.

Kaiser Aluminum & Chemical Corp. is a good example. The company has bet \$5 million on the future of aluminum forgings—the cost of expanding its Erie, Pa., forging plant.

Aluminum Co. of America is going into the fray armed with presses to 50,000 tons, experience dating from 1919, and some smashing ideas. Their prime target will be automotive and truck-trailer markets.

Outlook Fair—Bill Mechlenburg, manager of Erie Works, admits the big problem will be to find immediate work for the presses. But he sees no long-run bind.



THE KEY: This new 5000-ton, E. W. Bliss hydraulic press, along with its bigger and its smaller counterpart at Kaiser's forging plant in Erie, Pa., will let Kaiser push quality in selling aluminum forgings.

National Steel's Plans

National Steel Corp.'s 500,000-ton expansion of ingot facilities at its Great Lakes Detroit plant is a diversification step, not expansion for the sake of getting bigger.

This is what company chairman George M. Humphrey told the Security Analysts of Philadelphia last week. The former Secretary of the Treasury added that Great Lakes would eventually build inventory for National's coming Chicago mill (The IRON AGE, Feb. 26, p. 47) during slack periods in auto industry buying.

National Steel's long-range plans include the Philadelphia area as a mill site, Mr. Humphrey said, "after we digest the new Chicago operation."

He also told the investment men that, in relation to its size, National Steel has the industry's largest resources of raw materials.

Aluminum Smelter

American Smelting and Refining Co.'s secondary aluminum smelter at Alton, Ill., is now ready for full production. Its capacity is 72 million tons of alloy ingot annually.

The Asarco plant serves primarily the Detroit-Chicago-Cleveland area with emphasis on automotive. But the plant also supplies a Houston, Tex., warehouse.

Train Indian Steelmen

India's young steelmakers won't have to turn to Russia for training. Steel management in Britain and West Germany have finally agreed to train more Indian engineers.

Earlier, both had boggled at providing the training, but quiet pressure from the U. S. brought a change of heart.

The United States is training 100 young Indian steel engineers a year.

Weeks ago, when Britain and West Germany refused to take more than a handful of Indian students, the U.S.S.R. promptly offered to take on the entire training job. This offer is now being turned down.

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***Triton*, Navy's Largest Nuclear Sub, Uses Bridgeport Condenser Tubes**

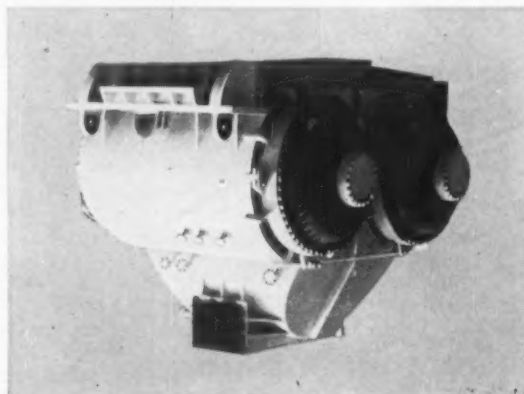
Launched in August, 1958, the U.S.S. *Triton* is the biggest, most powerful submarine ever built. With a length of 447 ft. and a displacement of 5,900 tons, *Triton* boasts, among other things, of two engine rooms and two reactor compartments. Built by the Electric Boat Division of General Dynamics Corporation, she is truly a major achievement in naval architecture.

Naturally, *Triton's* equipment must meet the most rigid operating requirements. Helping to fulfill these requirements are Bridgeport Cupro-Nickel condenser tubes in the Allis-Chalmers condenser and air ejector equipment.

Meeting operating demands such as *Triton's* has long been standard practice at Bridgeport. Outstanding operating records have been—and are being—achieved regularly. The experience and knowledge gained from these records can be put to your use—whenever you wish to take advantage of them.

Whatever your needs—simple retubing or other requirements—they are best served, in every respect,

by Bridgeport. If you have any problem, question or plans involving heat exchanger equipment, on land or at sea, call your nearest Bridgeport Sales Office. For full details, write direct for the 162-page Bridgeport Condenser Tube Handbook. Write Department 3404.



These twin condenser units were designed and built by Allis-Chalmers. Bridgeport tubes were used throughout.



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Dr. Ernst Albers-Schoenberg

He Finds New Uses for Ceramics

Foreign-trained scientists, like Dr. Albers-Schoenberg, are aiding U. S. technology.

At General Ceramics Corp., he is developing ceramics for use in electronics.

■ Dr. Ernst Albers-Schoenberg has been in the United States 11 years and everyone concerned is happy with the way things have turned out:

General Ceramics Corp., Keasbey N. J., has on its staff one of the world's authorities on magnetic materials.

The electronics industry has at its disposal "ferrites," several of them developed by Dr. Albers-Schoenberg. Ferrites are used in transformer cores, memory cores, telephone filters, antennae, and many other types of electronic equipment.

The American Ceramic Society has among its fellowship an outstanding contributor to the science of ceramics.

Dr. Albers-Schoenberg, himself, has established a good home for his family and is now vice president and research director at General Ceramics.

In Retrospect—Looking back now, it is inconceivable that Dr. Albers-Schoenberg wouldn't have made a success in America. Occupationally, his skills were much needed here. He was highly educated. And he is a solid family man (two of his three sons are chemists, the other a physicist; he also has a teen-aged daughter).

Perhaps it was the scientist's urge to find an atmosphere in which to carry out research unhindered that led him to risk the uncertainties of pulling up roots and starting



DR. ALBERS-SCHOENBERG: Leading research in ferrites.

a new life in a foreign land. But that's an old story in the history of America's growth.

His Earlier Work—Dr. Albers-Schoenberg was born in Hamburg, Germany, 61 years ago. He was educated at the University of Hamburg, where he received a doctoral degree in 1923, and at the Technical University of Berlin.

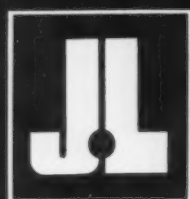
During the 30's, while with Steatit-Magnesia in Germany, he made a major contribution to development of carbon film resistors. He also developed magnesium titanates which are widely used as a ceramic capacitor material. His book, "Hochfrequenz Keramik" (Berlin, 1939), attracted wide attention.

Ferrite Pioneer—Perhaps Dr. Albers-Schoenberg is best known for his pioneering in the field of ferrites—compounds of metallic oxides which are made into magnetic products of many sizes, shapes and properties. Because of superior magnetic properties, they have displaced metallic magnetic materials in many areas.

With Dr. Albers-Schoenberg at the head of its research program, General Ceramics has become the world's largest producer of ferrites.

Last year, he was chosen by the American Ceramic Society to read the basic paper on ferrites before the inaugural meeting of its Electronics Section.

A BETTER START

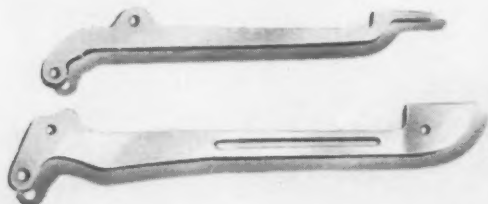


for YOUR product with
Cold Rolled Spring Steel

HERE'S HOW A "BETTER START" MADE THESE PRODUCTS BETTER:

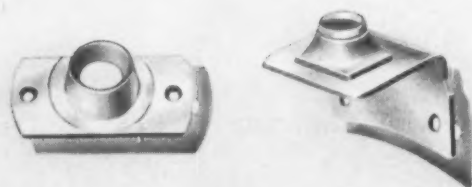
BUSINESS MACHINE PARTS:

- Eliminated grinding for gauge accuracy
- Improved stamping properties
- Reduced warpage in heat treatment
- Improved forming qualities



FASTENERS:

- Improved drawing qualities
- Reduced rejects
- Lowered production costs
- Cut quality control costs



COLD ROLLED SPRING STEEL MET THESE RIGID SPECIFICATIONS:

ANALYSIS: AISI 1055 • ROCKWELL: B 85-95
MICROSTRUCTURE: Uniform grain structure and carbide distribution
GAUGE TOLERANCE: $\pm .0003$ " including crown
WIDTH TOLERANCE: $\pm .005$ "
SIZE: 2" x .0384"
FINISH: No. 2 • EDGE: No. 3
COIL SIZES: 200/250 lbs. per in. width

ANALYSIS: AISI 1045 • ROCKWELL: B 72 max.
Deep drawing qualities
MICROSTRUCTURE: Well rounded and uniformly distributed carbides in a ferrite matrix
GAUGE TOLERANCE: $\pm .001$ "
WIDTH TOLERANCE: $\pm .005$ "
SIZE: 1½" x .020"
FINISH: No. 2 • EDGE: No. 3
COIL SIZES: 200/250 lbs. per in. width

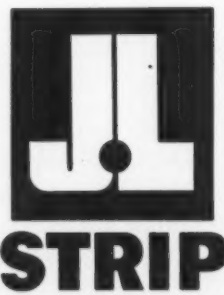


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Are Second Half Doubts Justified?

Inflated steel orders have created many second half question marks.

But businessmen have spent so much time looking over their shoulders that they haven't evaluated business gains in front of them.

■ How many of your business friends believe the steel market will collapse this summer, bringing the entire recovery down with it?

This concern has been more evident than most will admit outside their own offices. The question now: How much of this concern is valid?

Underestimated—The plain fact is that emphasis on steel has drawn attention from other industries that are having comebacks of their own. And these comebacks are not based on strike or price hedging, but on straight consumer demand.

It's surprising, but most executives have underestimated their own business this year. This was brought out last week in an IRON AGE survey of steel inventories. It turned up many users who admitted they were using more steel than they thought they would be.

Durables Come Back — Other than steel, you can find evidence of sharp gains in many of metal-working's biggest markets. Sales of some major appliances, for example, are running up to 34 pct over a year ago.

The auto industry a few weeks ago was willing to concede less than estimates. Now it is picking up its sights again. With what almost amounts to registering surprise, automakers report March sales 35 pct over a year ago, with year-to-date sales 25 pct over 1958.

Watch Your Figures—Year ago comparisons will bear a little watching, however. Last year the economy was in a sharp decline at this time. This year it is in an upturn. Comparisons of sales or production with similar periods of 1958 will go up sharply from now until autumn, when things started to pick up a year ago.

As weeks go by and if production indexes continue to climb, you will find less and less of the increase attributed to primary metals.

They are running within a few points of their peaks now.

Whole Picture — Elements to watch now are consumer durables, construction, and capital goods. If they continue to improve, there is little chance of a severe collapse after June.

That doesn't mean that steel inventories will disappear if you look the other way, but there is no reason to assume a national catastrophe. Other elements of the economy are on the upgrade too.

Hiring Policies Due to Relax

■ These reservations on the part of management make recent gains in employment stand out.

Most companies have been, and still are, most hesitant to take on new men as long as they have doubts about the probable course of business. You can figure that every new job is thoroughly studied before a new man is added.

Easing Ahead — However, this is getting to be on the expensive side and you can expect more relaxed hiring policies as the business outlook firms.

Durable goods employees are working an average of 2.3 hours overtime. Figuring that many in this category aren't yet back at full production, many workers must be working four or five hours overtime each week.

This is expensive labor. In primary metals, for example, average hourly earnings in February of this year were 22¢ higher than a year ago. Weekly earnings were \$6.99 higher.

Primary metals are no exception, however. Weekly earnings in all durable goods industries are up \$8.41 over a year ago, reflecting longer hours and higher pay.

How Railroads Slashed Steel Spending

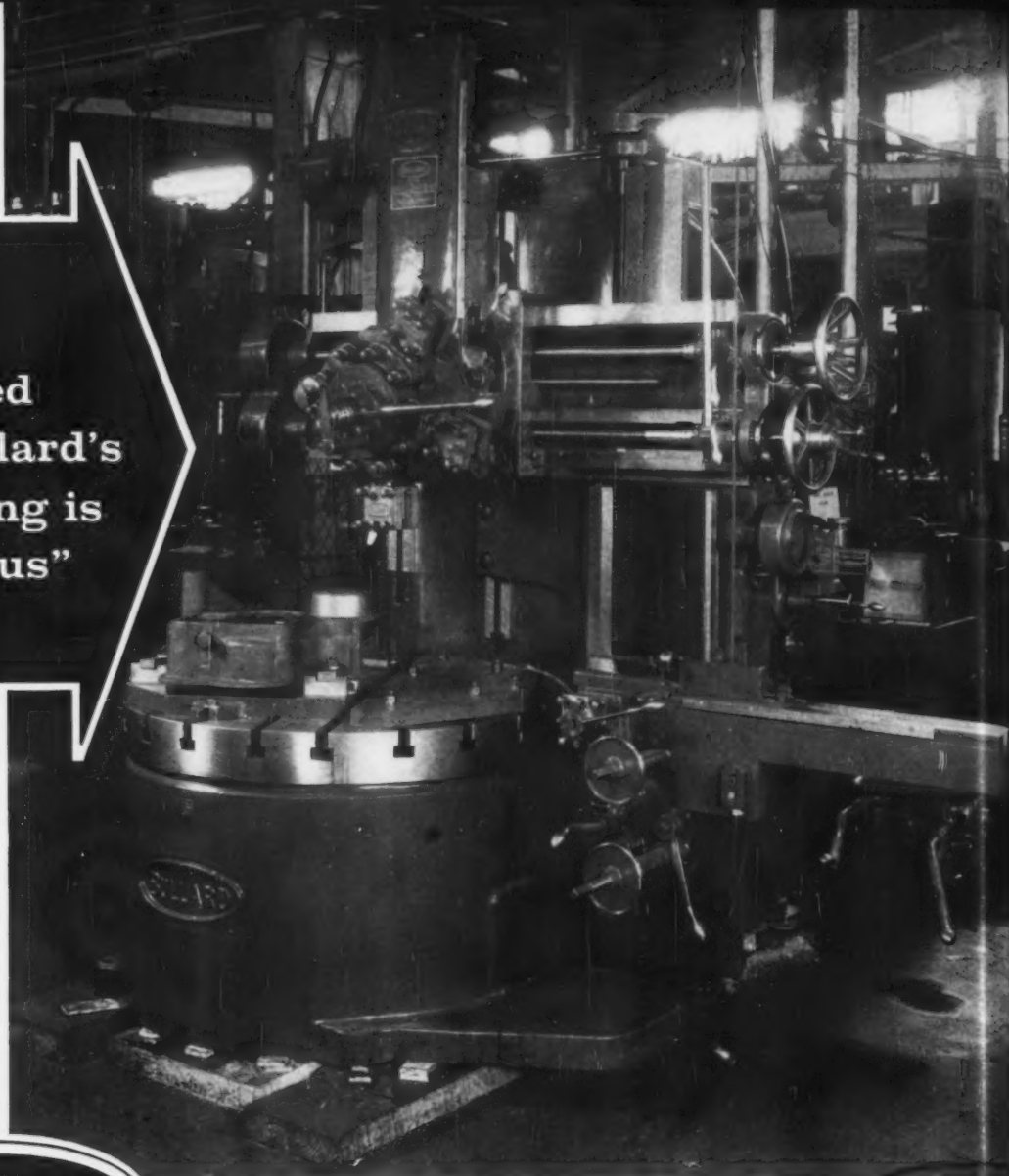
What happens to steel consumption when an industry really pulls in its horns?

A graphic example is the railroad industry, which offers these comparisons of 1957 and 1958 steel purchases:

Expenditures for iron and steel products of all kinds in 1958 amounted to \$320 million compared with \$608 million in 1957, the Association of American Railroads reports.

Spending for track material totaled \$104 million in 1958 compared with \$211 million the previous year; forgings and fabricated steel for rail cars cost \$24 million in 1958 compared with \$50 million in 1957.

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convinced
that Bullard's
rebuilding is
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54" Spiral Drive V.T.L. — similar to one rebuilt for Cann & Saul Steel Co.

This same reliable rebuilding, guaranteed for one full year, both parts and labor, can be applied to your Bullard equipment. For information, just mail the coupon or write

About a year ago, the Cann & Saul Steel Company, Royersford, Pa., had The Bullard Company rebuild its 54" Spiral Drive V.T.L. Says Mr. Russell Freed, Vice President, "After Bullard disassembled the machine, I visited their plant to check on certain phases of the rebuilding and believe me when they say "Bullard rebuilds from the ground up" they mean exactly that — it was completely disassembled right down to the last bolt. We were so satisfied with their work on this machine that we since have had them rebuild our 42" Spiral Drive V.T.L. — in other words — one good job deserves another."

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Spring Is Back in Auto Sales

Detroit Gets That Old Feeling as Orders Climb

After a three-year absence, the spring upturn in car sales is returning.

Most makes show gains. Optimists are hoping for a 5.5 million-car-year.—By H. R. Neal.

For the first time since 1955 automakers are almost willing to believe spring is still one of the four seasons. In the past it had always meant a significant upturn in sales of new cars. For the past three years they have hopefully looked for the spring sales spurt—but always in vain.

On April 1 this year, however, industry statisticians noticed a welcome trend while compiling March sales figures. And this was followed by a rash of glowing sales reports from a number of automakers.

The Early Reports — Unofficial figures indicate March sales at more than 490,000 units—up 35 pct from March 1958 and 12 pct better than February. Sales for the first three months of the year are estimated at 1,325,000 units—a healthy 25 pct greater than the same 1958 period.

Production, too, is keeping pace, according to the Automobile Manufacturers Assn. March output of 576,365 passenger cars was 61 pct greater than the 357,443 units produced in same month a year ago. And truck production was 52 pct ahead of March 1958 with 109,804 units compared with 72,284 units. Total vehicle production for the month was 60 pct better than the 1958 month.

Big Gain for Pontiac—For the

first quarter, passenger car output was 1,601,762 units, up 29 pct over the 1,239,928 cars produced in the same three months last year. Truck production was 308,227, 35 pct better than the 228,105 unit figure of a year ago. Total production was up 30 pct for the period—1,910,664 vs 1,468,998.

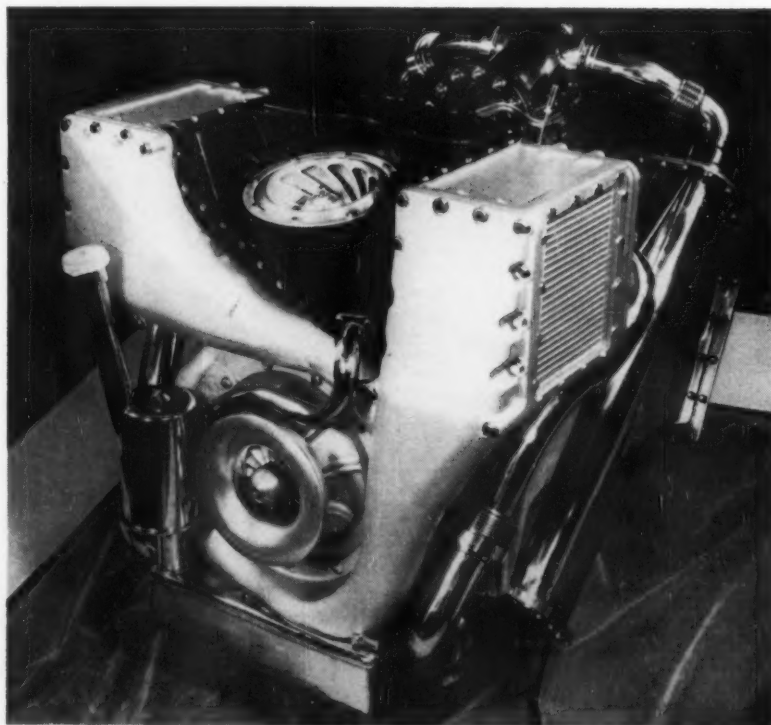
Pontiac boasts the biggest gains for March compared with a year ago, and its best sales month since December of 1955. Dealer deliveries of 36,641 new cars in March were 83 pct above a year ago. For

the first quarter its retail sales were up 52.5 pct above the same 1958 period. This has "rocketed Pontiac to the top sales position in the medium-priced field for the first quarter," the company claims.

Olds Counter-Claims—Not one to lose its laurels gracefully, Oldsmobile claims a sales lead of "nearly 14,000 ahead of our nearest competitor since the beginning of 1959 model production."

March sales, it says, were 34,561 units—25 pct better than the 1958

Ford's New Gas Turbine Engine



ALMOST READY: Ford Motor Co. expects to be testing this 300 hp, supercharged gas turbine engine in vehicles this year. It weighs 650 lb and will operate on gasoline, kerosene, jet fuel, or light diesel fuel.

month. And, a spokesman points out, in each of the past seven 10-day selling periods, Olds has experienced increases over similar 1958 periods.

Chevrolet Talks—In a rare disclosure of sales figures, Chevrolet reported March car and truck sales of 162,470 units—25 pct better than last year. Passenger car sales of more than 130,580 units were up 21 pct. Truck sales were up 41 pct to 31,890 units. For passenger cars, Chevrolet says, it was the best March since 1956; for trucks, the best since 1953.

Combined car and truck sales for the first quarter, 448,000 units, were second best for the period in Chevy's history and 20 pct better than a year ago. Car sales in the period were 363,000. Truck sales were more than 85,000. Chevy's best first quarter: 1956, when combined car and truck sales were 484,000 units.

Record Set at Cadillac—As if in rebuttal to claims the day of the big car is over, Cadillac announced its first quarter retail deliveries were

the "greatest for any first quarter in the 57-year history of the division." The record: 39,481 surpassing 1957's 39,447 deliveries to customers.

March sales were 13,281. Sales for the month and the first quarter were both 14 pct ahead of the 1958 periods.

Silence at Buick — Only Buick, puzzled by its failure to click, declined to join other General Motors divisions in releasing sales figures. Commented an executive: "Sales were up in March, but not enough to talk about."

Ford Is Jubilant—Ford Div. sold about 130,000 cars in March, 64 pct ahead of a year ago. For the quarter sales were about 350,000 units, 50 pct ahead of the 1958 quarter. On a model year basis, Ford claims to hold a 35,000 unit sales lead over Chevrolet. The division says it has delivered nearly 630,000 passenger cars in the 5.5 months.

Model year sales already total 65 pct of the entire 1958 model

Automotive Production

WEEK ENDING	CARS	TRUCKS
Apr. 11, 1959	133,027	26,230
Apr. 4, 1959	133,878	25,956
Apr. 12, 1958	84,997	16,863
Apr. 5, 1958	64,318	16,888
TO DATE 1959	1,816,266	349,279
TO DATE 1958	1,375,584	257,477

*Preliminary

Source: Ward's Reports

year with the best selling months just starting.

Upward Revision—After a look at the sales figures, Ford decided to raise its April production schedule 20 pct. The division expects to produce 140,000 passenger cars this month, slightly above the March total of 136,877.

Ford truck sales for the quarter totaled 68,000 units. Middle-priced lines Mercury and Edsel also participated in the improved market—to a lesser degree than Ford.

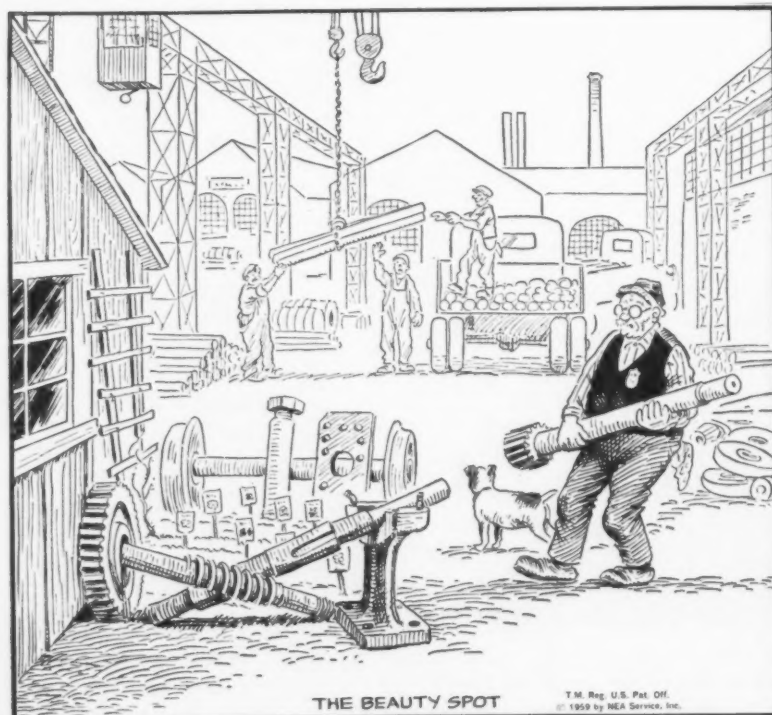
Chrysler Starts Late — Chrysler Corp., still in the process of building field stocks, hasn't issued any sales reports. However, an executive recently estimated first quarter sales at 11 pct of the market—or about 145,600 units. For the rest of the model year the company has once again hopefully set its sights on 20 pct of domestic car sales.

And the independents haven't bothered to pause to catch their breaths since last Fall. The "Little Two," American Motors and Studebaker-Packards, have sold about 110,000 units in the first three months of the year, taking better than 8 pct of industry sales.

April Will Tell—But for all the joy in the land of wheels, it still doesn't add up to a boom. Compared with 1958, it is a substantial improvement. Compared with "normal" years of 1956 and 1957, it is not quite so good.

Cooler heads at the calculators are arguing over whether the brightening sales outlook will carry the industry to a 5.3 or 5.5 million unit year. April should be the critical month.

The Bull of the Woods



THE BEAUTY SPOT

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The pitman connection
of the new Oliver-Farquhar
O. B. I. Mechanical Gap Press
provides two basic advantages...
easy slide and die adjustment
and extra strength.

This Oliver-Farquhar Press has

STRENGTH

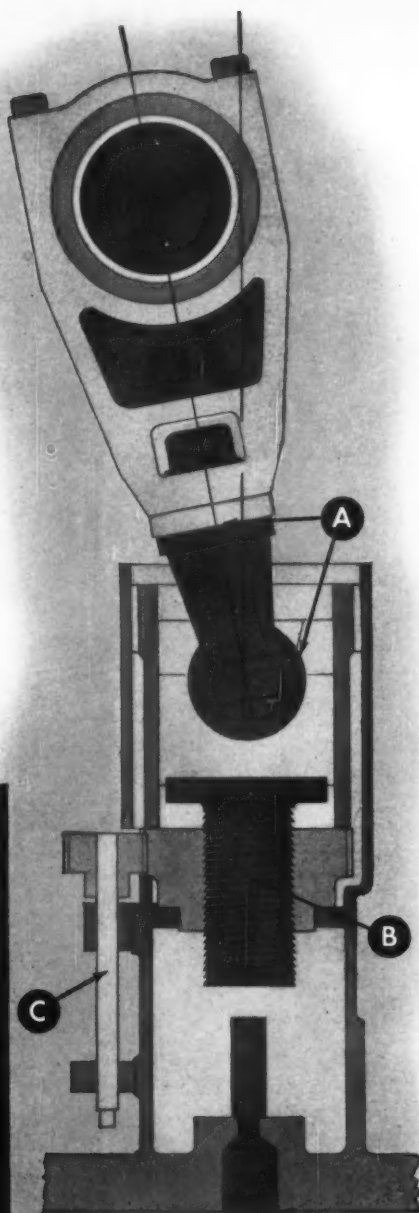
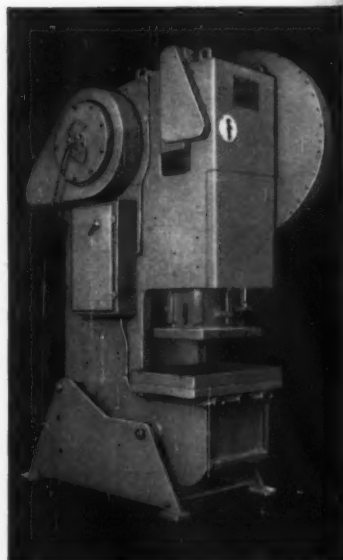
where you need it...

Easy slide adjustment

where you want it...

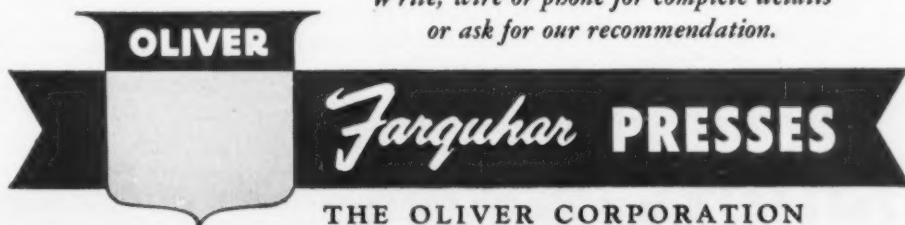
The Oliver-Farquhar O. B. I. Mechanical Gap Press has a heavy-duty barrel type pitman connection with the slide adjusting screw fully guided to eliminate side thrust and bending loads on the screw. It withstands the full loads of the press at each stroke and the shocks developed in pressing and stripping. There is no danger of bent screws and cracked or broken pitmans. For faster, easier floor level slide adjustment, a simple, directly connected shaft extends to lower end of slide. No special wrench is required for this manual adjustment.

Oliver-Farquhar O. B. I. Mechanical Gap Presses have many features—in addition to the strong pitman connection—that guarantee years of dependable, efficient service. They are available now for delivery in four standard models: 75, 110, 150 and 200-ton capacities.



Oliver-Farquhar design...
(A) Critical areas are thoroughly supported for maximum strength. (B) Fully guided adjusting screw is held firmly in base. (C) Easy, floor-level adjustment.

Write, wire or phone for complete details
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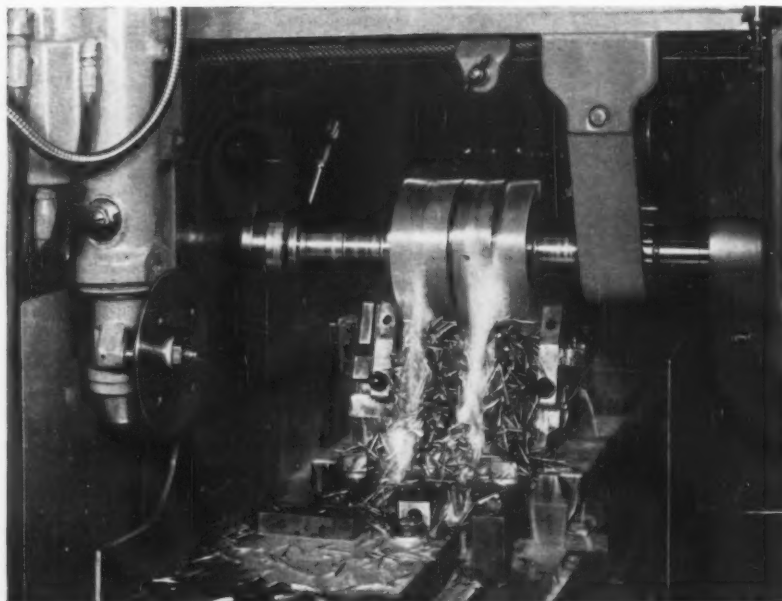
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Cincinnati TRACER CONTROLLED HyPowermatic



--- mills airfoil section of
turbine blades in two operations



Tracer control mechanism (left in the illustration), built-in automatic backlash eliminator, and automatic deflection compensator for the overarm are prominent feature-advantages in this HyPowermatic setup . . . down-milling the airfoil section of turbine blades; up to 9" length of blade in one cut.

Airfoil sections of steam turbine blades are not the easiest shapes to machine. They present two unusual problems: 1) the turbine blade contour must be accurately reproduced, and 2) length and structural strength of the section impose unique requirements on the machine performing the operation. Both problems disappear when the work is assigned to a CINCINNATI Tracer Controlled HyPowermatic Milling Machine.

Contour and entire length of the airfoil section are milled in only two operations

HyPowermatics offer many advantages for heavy duty work. These fine milling machines are powerfully constructed to remove metal rapidly and smoothly. The tracer control mechanism

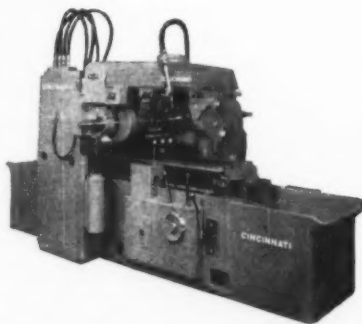
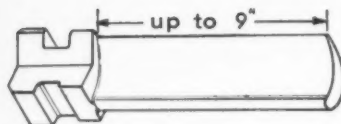
operates from inexpensive templates attached to the machine table or work fixture. It will accurately trace curves and straight lines up to 80° from the horizontal. HyPowermatics are equipped with an automatic backlash eliminating device which extends the range of work assignments to include down-milling. The Dynapose overarm, another of the many exclusive features, incorporates an automatic hydraulic deflection compensator.

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OPERATION



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Two types: 1) for conventional milling operations; 2) for tracer controlled milling operations. Plain and duplex styles. 42 sizes of each. Table travel 36" to 168". 7½ hp to 50 hp spindle drive. Sixteen spindle speeds 40 to 1 ratio. Infinite number of table feeds.

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What Congress Plans for Steel

Both Management and Labor Will Be Put on the Spot

Legislators see headlines in steel labor problems.

They're scrambling for publicity with a hopper full of solutions.—By G. H. Baker.

■ The steel industry is looking more and more like fair game to stalking Congressmen.

Before steel management and the AFL-CIO United Steelworkers get to face each other across the bargaining table, it is likely they'll be looking at lawmakers from the witness chair.

May 17—First off, the Senate antitrust subcommittee plans to start public hearings April 22 on a bill requiring steel producers to get government permission before raising prices. The bill is backed by Senators O'Mahoney (D., Wyo.); Clark (D., Pa.); and Rep. Reuss (D., Wis.).

Under the proposed law, price increases would be suspended for 30 days while a government agency, probably the Federal Trade Commission, holds public hearings to try to influence public opinion and put on the pressure to hold prices down.

Steel Under Pressure—Also in store for steelmen: The Senate-Economic Committee is seriously thinking of calling top management and union leaders to a series of open hearings in May or June. Purpose: To try to talk the USW into accepting minimum wage rises, and to try to convince steel heads they don't need a higher price. Sen. Paul Douglas (D., Ill.) is in charge.

These are the major headline hunting expeditions on the agenda. And neither is likely to succeed in terms of legislation. Even if a bill

should reach the White House, it's considered a dead certainty it would die right there.

But this isn't going to discourage other Congressmen from getting in on this "good thing."

Also in the Cards—Sen. Albert Gore (D., Tenn.) wants Congress to impose "utility type" price regulations on the steel industry. Prices would be fixed by a government board or commission.

Sen. Neuberger (D., Ore.) looks at the big picture, wants authority for all out controls over all industrial and consumer prices deposited with the White House, ready for instant use.

Sen. Symington (D., Mo.), who's trying to build himself up as a candidate for President next year, also denounces the steel industry's administered prices, and demands government action to correct them.

From White House—Even the White House Council of Economic

Advisors is getting into the act. It is wondering out loud if "administered prices" are behind our inflation, and thus should be replaced.

Foreign Aid Problem

Strange sidelights of this country's embattled foreign-aid program keep showing up.

Latest: India's new budget for the year ending 1960 calls for \$4.3 million to be spent for technical and economic assistance to its neighboring countries. But we are pouring \$356 million into India for, of all things, technical and economic assistance in the current fiscal year.

If Congress goes along with the President's proposals a similar sum will be given to India again in the next fiscal year.

Although spending about \$4 billion a year is backed by top Republican and Democrat party leaders, the number of critics in Congress and business circles continues to grow.

Old Soldiers Kick Up Heels

What Old Soldiers Say—Two retired Army generals are causing some raised eyebrows in the Pentagon by calling for a halt in the armament race with the U. S. S. R.

Gens. Jacob L. Devers and John E. Dahlquist say it's time to stop trying to match the Reds missile-for-missile. War is the inevitable result of this course, they warn.

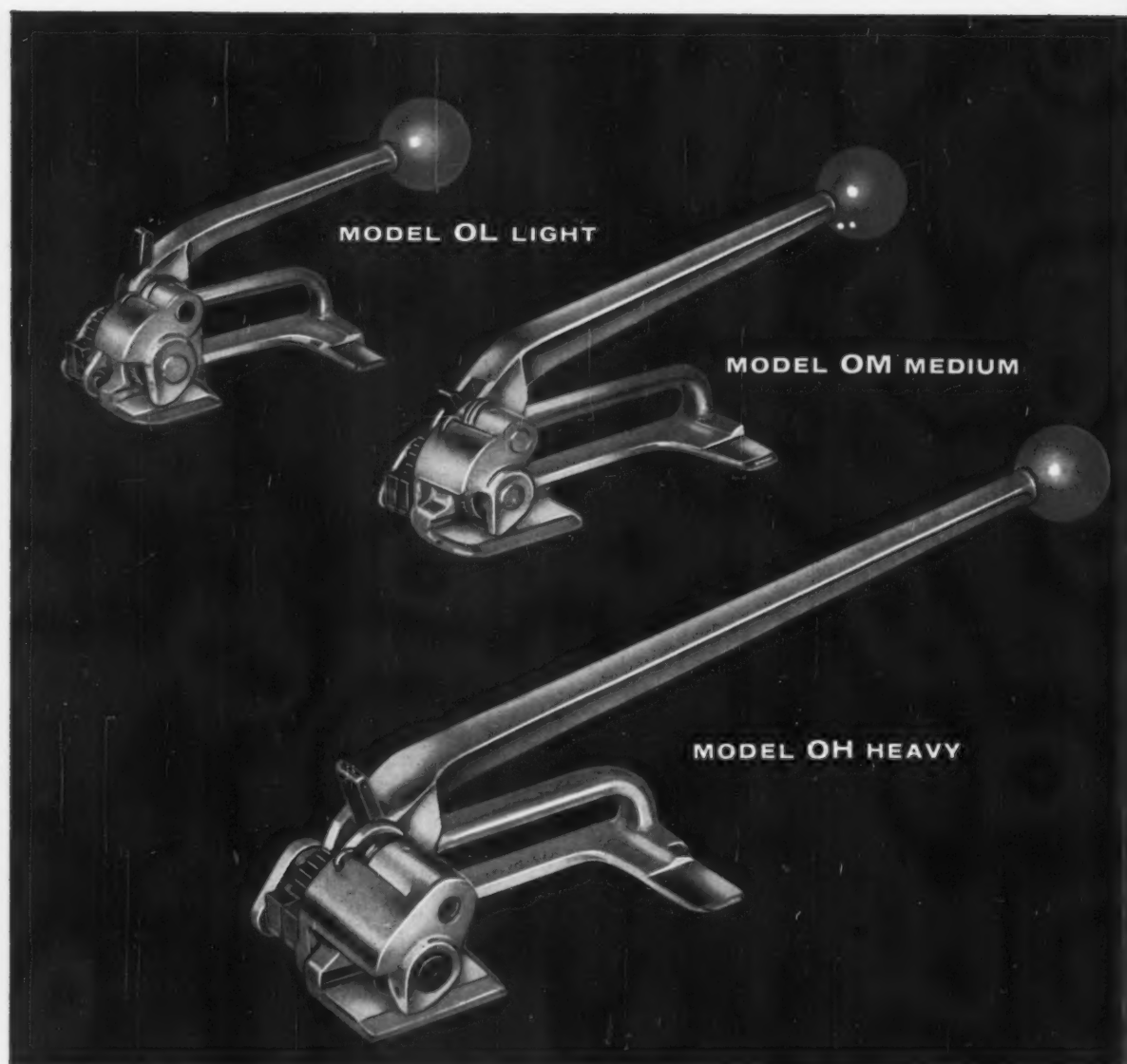
Look at the Record — "Arms competition, such as that engaged in between the U. S. S. R. and the U. S., has always resulted in war,"

Gen. Dahlquist says. "It is time to do something rather than spew out a cloud of invectives that mean nothing and accomplish nothing."

Most of the current antagonism between the two nations is simply the result of misunderstanding, Gen. Dahlquist contends. He urges a free flow of information between peoples of the two nations as the first step toward amity.

Next step: Level off arms procurement.

Outlook: Not likely to get far.




New Heavy Duty Steel Strapping Tool completes STANLEY Line of "O" Tighteners

Stanley's new OH Tightener is the only heavy duty friction wheel steel strapping hand tool on the market today for use with cold rolled $\frac{3}{4}$ " and $1\frac{1}{4}$ " x .031 and .035 steel strap. This portable, lightweight, high leverage tightener efficiently packages products and containers of every type, size,

shape and weight . . . increasing packaging flexibility. Seals applied behind the tensioning wheel eliminate strap waste.

Strapping Data available from Stanley Steel Strapping, Division of The Stanley Works, Dept. D, 1317 Corbin Ave., New Britain, Conn.


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Nineteen Pct More Steel in '59

That's Forecast for Steel Use in the Farwest

Boosts in construction activity should bring Western steel-makers a banner year.

So predicts L. B. Worthington, president of USS's Columbia-Geneva Div.

Shipments may reach 6.8 million tons.—By R. R. Kay.

■ Steel shipments in the 11 Western states should hit 6.8 million tons this year—up a hefty 19 pct over 1958.

That's the prediction of L. B. Worthington, president of the U. S. Steel's Columbia-Geneva Div. at a Los Angeles meeting of the National Industrial Conference Board.

Mr. Worthington forecasts a banner year for the steel industry in the Farwest. Why all the optimism?

Building Plans Help—Construction is the No. 1 steel user in the Farwest. There are big plans underway for new pipelines, municipal water systems, a rise in military outlays for construction, and a 10 pct increase in highway building.

Mr. Worthington predicts, "The Western construction industry should consume about 18 pct more steel in 1959 than during 1958."

Enter the Villain—All in all, it will be a cheering year for the steel industry in the West. But foreign steel is a fly in the ointment.

Last year over 5 pct of all steel bought there was imported. That doesn't sound like much. But by product the impact is revealing.

What Foreigners Supplied—The region imported more than half its nails and barbed wire and over



MORE, MORE, MORE: Construction of new pipelines, water systems, and highways will help boost Farwest's demand for steel this year. Builders may need 18 pct more steel than in '58. (Kaiser Steel Corp. photo).

one-third of all its small diameter pipe.

One important reason: These imported products were brought in at lower prices. A 100-lb carton of American nails sells for \$11.80 at U. S. Steel's Pittsburg, Calif., mill. The same carton of Japanese nails is offered in the area for \$9.80.

Reinforcing bar, wire rods, and merchant wire products are coming in to the West at an alarmingly higher rate. Mr. Worthington is worried about it.

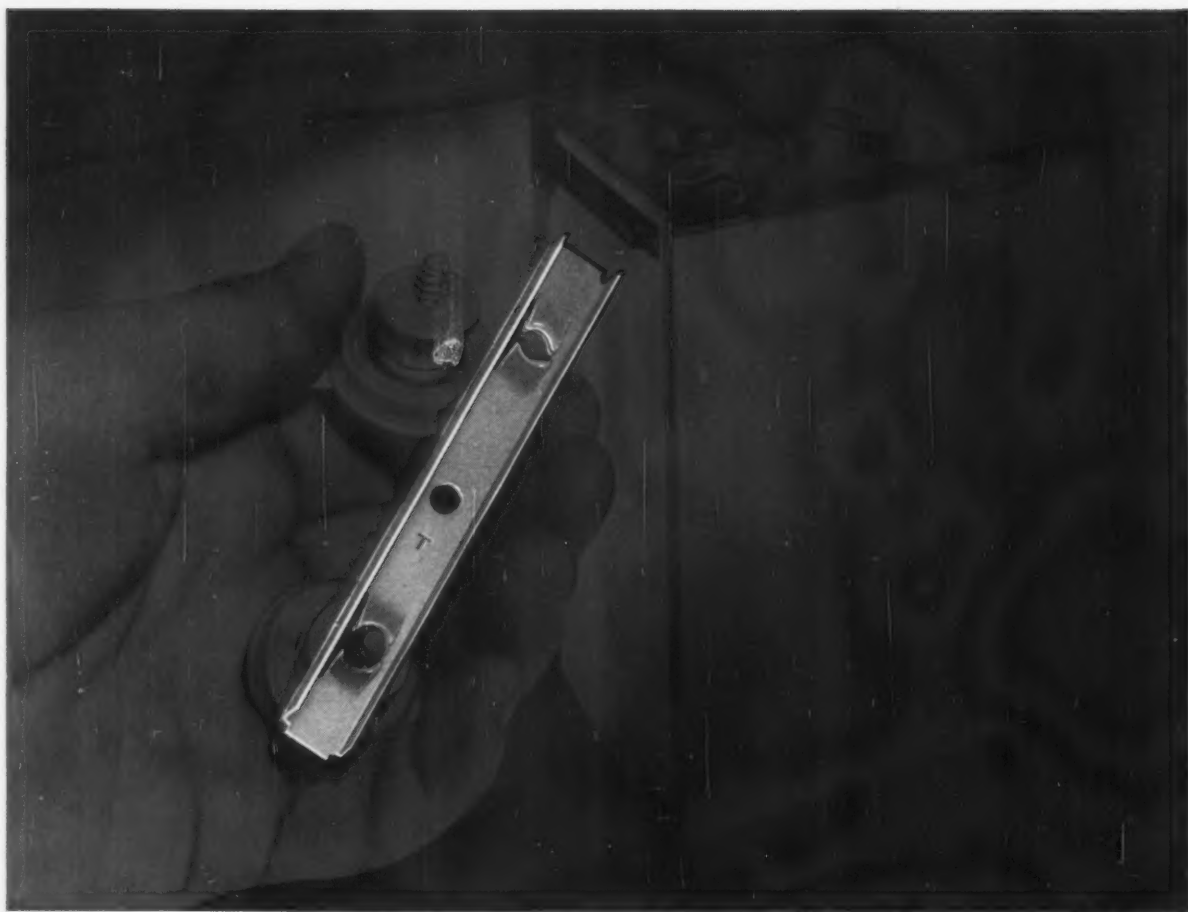
Second Quarter Hopes—General business conditions will be very good in the 11 Western states for the second quarter.

Here's how the 1000-member Western Business Forecast Panel surveyed by Prudential Insurance Co. of America sees it:

Almost 75 pct say their own second quarter business will be up over the first quarter, 16 pct believe it will be the same, and only 12 pct predict a downslide.

The most optimistic group is in Washington-Oregon. Business leaders polled there say almost unanimously (93 pct) that their second quarter will top the first.

Montana-Idaho-Utah showed up with the greatest gain in optimism over previous tallies.



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First, the saving in material on the General Electric Dishwasher... a Tinnerman SPEED NUT brand fastener is formed right in a channel stamped from high-carbon spring steel. This replaces a costly solid steel bar formerly used to mount the pull-out basket rollers.

Next, the Tinnerman SPEED NUT impressions are stamped right in the channel; expensive boring and tapping of the bar stock are eliminated.

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General Electric's dishwasher production goes faster and assembly costs are reduced by the easy-to-apply feature of the simplified SPEED NUT part. The difference in weight even makes an important reduction in freight costs on each carload shipment of dishwashers.

What Tinnerman SPEED NUTS accomplished for General Electric can probably be done for you.

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Toolmakers Are Economic Force

The Targets Are Inflation, and USSR Trade Warfare

Leo Hoegh, Civil and Defense Mobilization director, tells how important the tool industry is in our economic picture.

And, he has constructive suggestions.—By E. J. Egan, Jr.

■ The government sees the machine tool industry as a potent economic force on two fronts.

One involves the growing war between the U. S. and the Soviet Union for economic supremacy.

The other: The bitter fight against inflation here at home.

The American Machine Tool Distributors' Assn. got this message from Mr. Leo A. Hoegh at its Spring Meeting in Washington, D. C. He is the director of the Office of Civil and Defense Mobilization.

Modern Outlook—Traditionally, Washington planners tend to think of machine tools in a purely military frame of reference. To a great degree this is still true. But Mr. Hoegh wrote a few new notes into the old tune.

He is quite emphatic about the industry's role in the current economic hassle with the Reds. "Your position in this economic conflict—in this most important race in the history of the world—cannot be overstated," he declared. Our economy has grown at an average annual rate of 3 pct in the past, says Mr. Hoegh. And he believes we can and should boost the rate to 5 pct per year. He feels this would put the lie once and for all to communist claims of impending capitalistic disaster.

Carry the Ball—"If we are to add another 2 pct to our annual growth," he said, "a major share of that in-

crease must come from increased productivity. I need not tell you the important part the machine tool industry will play in that achievement."

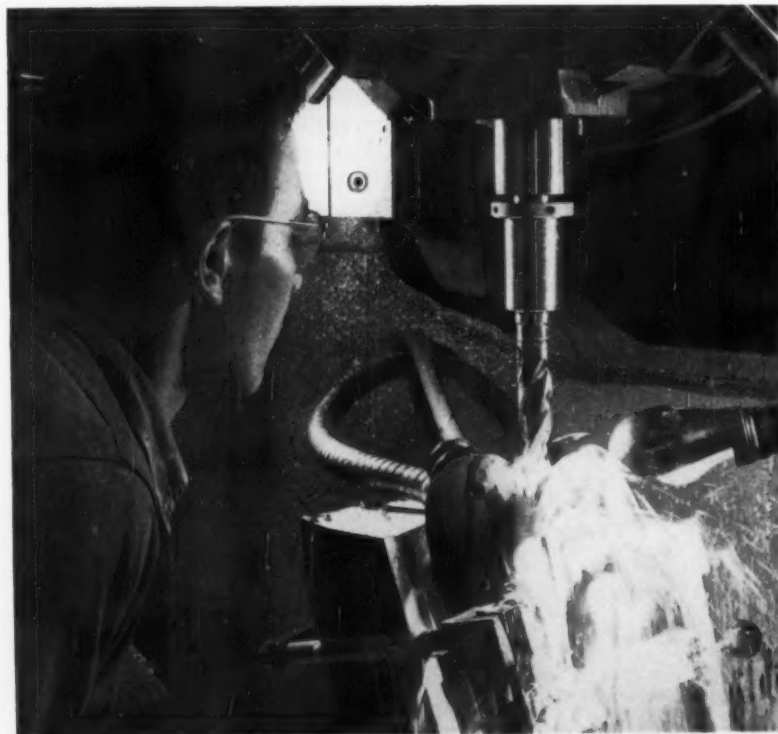
On the inflationary threat on the domestic front, he repeated lesson No. 1: "It comes about when demands exceed the available supply." The "finger in the dyke" that holds back the flood of inflation is industry's ability to keep up with growing demand from a growing population. "We cannot afford to relax our vigilance," he cautioned.

Pianissimo — Mr. Hoegh played

parts of the old tune about machine tools to make the tools of war, but he kept his foot on the soft pedal. Judging more from what he didn't say than from what he did say, it seems that mobilization plans are geared for a big, but all at once war.

Take Precautions — To prepare for any emergency, he suggested the industry put "key drawings, blueprints, plant layouts and vital information in safe places." He also recommended companies draw up organization plans to insure continuity of management.

Don't Spare the Oil



AIDS IN CUTTING: A steady flow of Gulfcut heavy duty soluble oil improves drilling operation at Reed Roller Bit Co., Houston, Tex.

INDUSTRIAL BRIEFS

Lukens Buys Boatmaker—Lukens Steel Co. has acquired a New Jersey small boat maker and set up a new subsidiary, Bran-Del Corp., as parent of the new acquisition. This purchase of Clayton Skiffs, Inc., Toms River, N. J., is the first move in a program of diversification announced by the Coatesville, Pa., steel company.

Foundry Rebuilding—An electric steel foundry has been completed by LFM Mfg. Co., a subsidiary of Rockwell Mfg. Co. Completion of the present foundry represents a \$3 million two-year program of rebuilding all prior facilities, plus a 50 pct expansion area under one roof.

M-R Buys Nelson—Midland-Ross Corp., Cleveland has acquired all the assets of the Nelson Metal Products Co., Inc., Grand Rapids, Mich., a producer of zinc and aluminum die castings for the automotive industry.

Oxygen at Denver—Air Reduction Sales Co., a division of Air Reduction Co., Inc., has completed its new oxygen and nitrogen plant at Denver, Colo. The plant is the first major gas-producing installation which Air Reduction has built in the general area.

Gearmaker Moves—The Philadelphia Gear Corp. has begun construction of a new manufacturing plant at King of Prussia, Pa., replacing the company's present facilities located in Philadelphia. The plant will manufacture ultra-precision gear products.

Ohio's Gain—C. F. Simmers Inc., has been established in Canfield, O. The newly-organized corporation will specialize in design of heavy crane, rolling mill, and allied equipment plus industrial and steel plant layout and studies. Mr. Simmers was formerly vice president, engineering, of the Morgan Engineering Co., Alliance, O.

Three Mitchells Merged—The R. C. Mahon Co., has acquired three affiliated California corporations, Walter G. Mitchell Industries, Mitchell Steel Inc., and Mitchell Properties Inc., Torrance, Calif., and will merge operations of the firms with those of Mahon in a new plant.

Journey to Holland—R. S. Kahn, vice president, Tube City Iron & Metal Co., Glassport, Pa., will attend the Bureau International de la Recuperacion meeting in the Netherlands next month. He is a director of the National Assn. of Waste Material Dealers.

New Pipe Distributor—Aetna Engineering Co. of Alton, N. H., is distributing new 4-D wrought iron pipe for A. M. Byers Co., Pittsburgh. Aetna is marketing the corrosion-resistant pipe in cooperation with Byer's division office in Boston.

Dravo at the Capital—The Dravo Corp., Pittsburgh, has opened a Washington office in the Dupont Circle Building. Clyde H. Slease is in charge of the office and will continue as assistant to the president and counsel for the company.

GE Shifts Conduit Office—General Electric will move its Conduit Products Dept. headquarters office from Bridgeport, Conn., to Niles, O. The transfer will be effective June 1.

On to Japan—Kaiser Engineers & Constructors, Inc. has a contract by Sumitomo Metals Industries, Ltd., Osaka, Japan, to perform consulting engineering services in the proposed expansion program of Sumitomo's Wakayama, Japan, steel plant. Cost of the first stage of the overall program is about \$80 million. It will be financed, in part, through a \$33 million World Bank loan.

Asarco District Move—The Detroit sales office of Federated Metals Division of American Smelting & Refining Co., has moved to 522 New Center Bldg., 7430 Second Ave., Detroit 2, Mich.

JATO in Japan—A sales agreement for the distribution of selected Aerojet-General products in Japan has been signed between Aerojet-General Corp. of Azusa, Calif., and Mitsui & Co., Ltd. of Tokyo. Mitsui will be exclusive Japanese representative for Aerojet-General's JATO (jet assist take-off rockets) and the Aerobee series of high altitude sounding rockets.

J & L Handles Valves—Jones & Laughlin Supply Div. has announced an agreement to distribute Rockwell - Nordstrom plug valves through their stores and offices. These valves are manufactured by Rockwell Mfg. Co. of Pittsburgh.

Metal Graters Elect—J. Edinson, is now vice president of the Metal Grating Institute. His election took place during the group's March 19 meeting in Pittsburgh. Mr. Edinson is general sales manager, Klemp Metal Grating Corp., Chicago.



RAIL AND TRACK EQUIPMENT

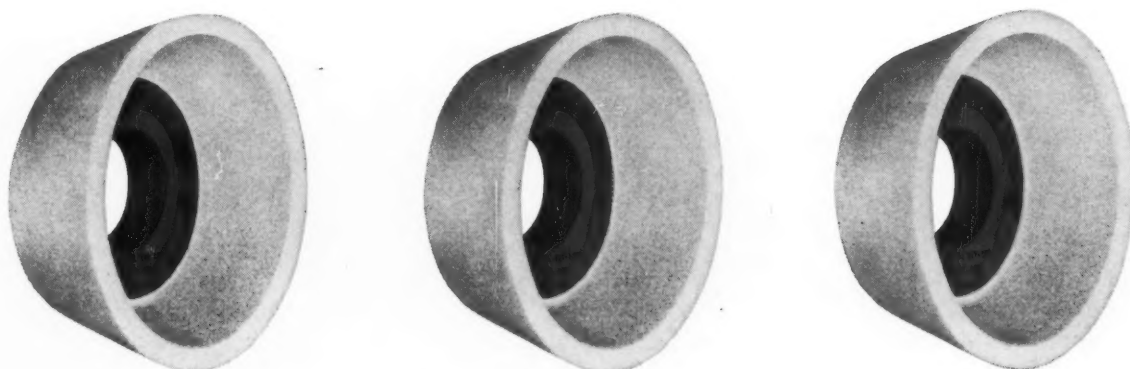
You can get everything you need for industrial track and crane runways —with one call to your nearest Foster office. Immediate deliveries from the nation's largest warehouse of rails (both new and relaying), switch material, and track accessories. Send for free catalogs and ordering guides.

L. B. FOSTER co.


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POSITIVE DUPLICATION — EVERY TIME!





Each of these gyroscopes positively duplicates the built-in balancing action of every other gyroscope.

 And *balance built-in* is an important advantage you get with the toolroom cup wheels shown above, and with all CINCINNATI **PD**° GRINDING WHEELS. They are manufactured by a remarkable process that gives Positive Duplication, time after time.

 With every step of manufacturing rigidly controlled, this unique **PD** process produces wheels of unsurpassed uniformity. One important result: balanced action for a safer job . . . a better job.

When you reorder a CINCINNATI **PD** WHEEL, it will act and grind exactly like the original, helping you maintain production, saving time and money. Whatever shape, grade and size

 you specify . . . centertype, centerless, internal, surface, toolroom or snagging wheel . . . you get Positive Duplication — every time!

 Our factory representatives are trained specialists, experienced in grinding job set-ups and operations. For their help on those extra-tough grinding problems, call your CINCINNATI **PD** GRINDING WHEEL distributor, or contact Cincinnati Milling Products Division, Cincinnati 9, Ohio.

PD POSITIVE DUPLICATION

CINCINNATI
GRINDING WHEELS

A PRODUCTION PROVED PRODUCT OF THE CINCINNATI MILLING MACHINE CO.



it will still be as beautiful
when she grows up

UNILOY

STAINLESS STEELS

Yes . . . when she's ready to drive her own car, she too will want the long lasting beauty and protective qualities of solid stainless steel trim . . . and if this car is still around, the trim will be just as beautiful as it is today.

For stainless that offers maximum ease of fabrication and lasting, lustrous finish, specify Uniloy Stainless Steel.

UNIVERSAL

CYCLOPS
 STEEL CORPORATION
 BRIDGEVILLE, PA.

STAINLESS STEELS • TOOL STEELS • HIGH TEMPERATURE METALS



H. A. Roemer, Jr., formerly president, Sharon Steel Corp., has joined Pittsburgh Metallurgical Co., Inc., as manager of the company's Cleveland district office.

J. J. Hayes, elected president, Morse Twist Drill & Machine Co., New Bedford, Mass.

J. A. Taylor, elected president, Standard Screw Co., Bellwood, Ill.

E. C. Austin, appointed vice president, procurement, The Fluor Corp., Ltd.

G. K. Viall, appointed senior vice president, Chain Belt Co., Milwaukee.

E. C. Scoville, appointed director, purchases, Arthur G. McKee & Co., Cleveland.

B. E. Olsen, promoted to chief engineer, Stanscrew fastener line, Standard Screw Co., Bellwood, Ill.



M. W. Cresap, Jr., elected president and chief executive officer, Westinghouse Electric Corp.

D. C. Skelly, named manager, Quality Control Laboratory, Harbison-Walker Refractories Co.'s Hays Works near Pittsburgh.

G. F. Whiteley, appointed manager, Bridgeport, Conn., plant, Heppenstall Co.

G. E. Warner, appointed sales manager, process computers, General Electric Co.'s Computer Dept., Phoenix, Ariz.

J. C. Humphries, named West Coast district manager, aircraft, missile fastener sales, Standard Pressed Steel Co., Jenkintown, Pa.; **L. W. Johnston**, named West Coast district manager, industrial fastener sales.

A. B. Glossbrenner, named superintendent, Conditioning Dept., The Timken Roller Bearing Co.'s Steel and Tube Division.

C. T. Smith, appointed an assistant marketing manager, Boiler Div., The Babcock & Wilcox Co., Barberton, O.

R. V. Merrell, named general sales manager, Atkins Saw Div., Borg-Warner Corp.

P. L. Richardson, named technical advisor, Sales Dept., Eastern Stainless Steel Corp.



G. A. Price, elected chairman of the board, Westinghouse Electric Corp.



R. E. Price, elected executive vice president and assistant general manager, Landis Tool Co., Waynesboro, Pa.

C. W. Burr, appointed manager, Milwaukee district sales office, Inland Steel Co.

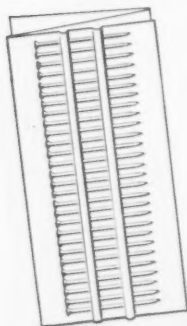
C. J. McDonall, appointed district sales manager, New York, Vanadium-Alloys Steel Co.

The following appointments are within the Federated Metals Div. of American Smelting & Refining Co. **L. D. Alpert**, named general manager of the Division's Whiting, Ind., plant; **P. H. Jackson**, named general manager, Eastern Dept.; **G. F.**
(Continued on P. 107)



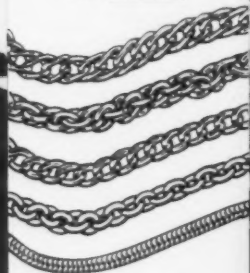
J. L. Molner, elected a vice president, National Acme Co., Cleveland.

These **PINS**
need stiffness



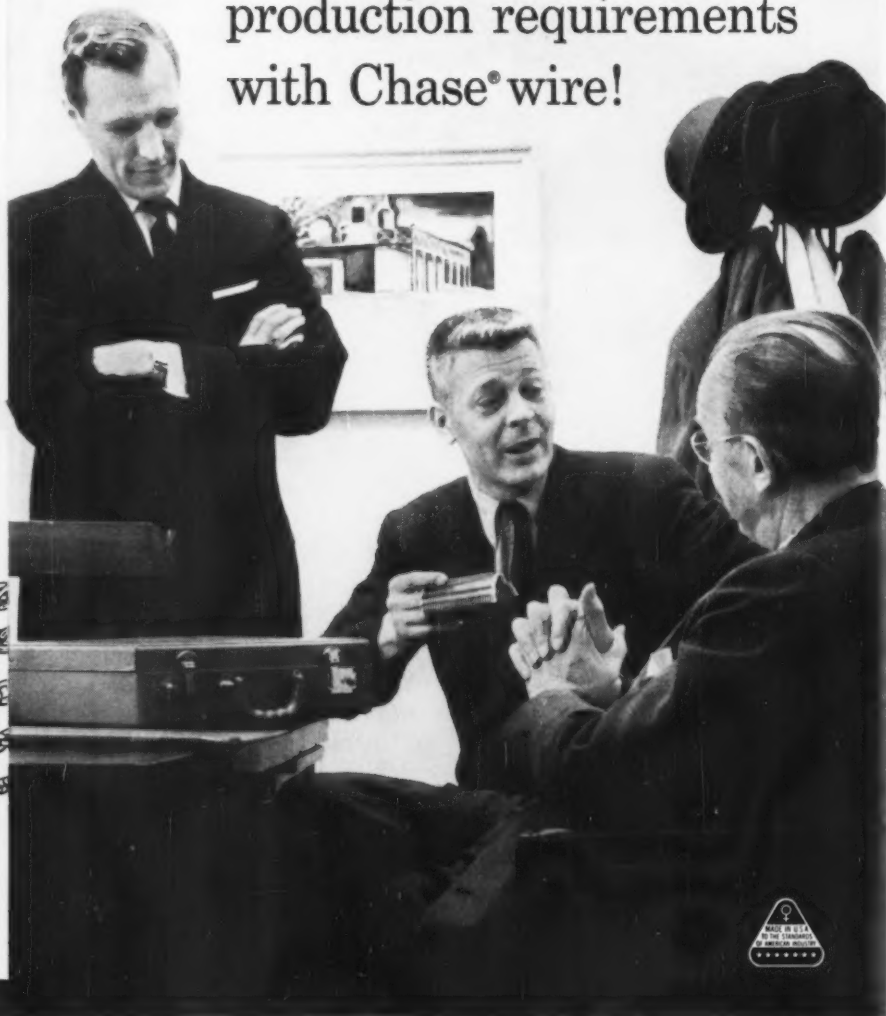
Pin wire needs stiffness,
but it must be easily
worked to form the heads.

Wire for these
CHAINS requires
a fine Surface
and Ductility



Jewelry chains are made
from wire that takes a
beautiful finish and is
easy to work.

We can match your
production requirements
with Chase® wire!



The Chase Wire Service Man is shown here in a typical conference with production men.

Wherever you use copper alloy wire, it will pay you to see what the Chase® Wire Service Plan can do to help you. Here's how the plan works: You tell us what you do with wire—what properties you need. Tell us the problems you're having, show us the parts you make. A Chase Wire Service Man can help you find the wire that's *right* for your needs among all the types Chase makes. If Chase doesn't already make it, we'll *product-engineer* wire for your needs.

Matching your production requirements for wire comes naturally to the man who knows wire best...the Chase Wire Service Man. You can reach him through your nearest Chase warehouse or District Office—or by writing Chase at Waterbury 20, Connecticut.



PRODUCT-ENGINEERED WIRE

Chase 

BRASS & COPPER CO.

WATERBURY 20, CONN.

Subsidiary of **Kennecott Copper Corporation**

THE NATION'S HEADQUARTERS FOR ALUMINUM • BRASS • BRONZE • COPPER • STAINLESS STEEL

Atlanta Baltimore Boston Charlotte Chicago Cincinnati Cleveland Dallas Denver Detroit Grand Rapids Houston Indianapolis Kansas City, Mo. Los Angeles Milwaukee Minneapolis Newark New Orleans New York (Maspeth, L.I.) Philadelphia Pittsburgh Providence Rochester St. Louis San Francisco Seattle Waterbury

THE impossible IS commonplace

WHEN FINISHING IN A

ELLIOTT
VIBRASLIDE



More and More

Manufacturers of

Aircraft Fittings
Aircraft Instruments
Aluminum and Zinc Die Castings
Automotive Transmissions
Compressor Valves
Computers
Electric Control Instruments
Furniture Hardware
Gears
Hand Tools
Mechanical Seals
Mechanical Springs
Metallic Packings
Micro-wave Systems Components
Missile Guidance Systems
Packaging Machinery
Powdered Metal Parts
Ordnance Components
Radar Components
Semi-Conductors
Sewing Machines
Textile Machinery
Thread Guides

are profiting by using VIBRASLIDE for
NEW cost cutting Finishing that could
not be done by other mechanical
methods.

Find out **NOW** how VIBRASLIDE can
improve your finishing results.

Write for catalog and complete
information.

**metal
finish, inc.**

412 FRELINGHUYSEN AVE.
NEWARK, N. J.

(Continued from P. 105)

Norman, named vice president and general manager, Federated Metals Canada, Ltd.; H. Trihey, named manager of Federated Canada's Montreal plant.

R. H. Mezger, appointed district manager, Worcester, Mass., industrial sales office, Vickers Inc., Div. of Sperry Rand Corp.

A. S. Nelson, appointed Chicago district sales engineer, Construction Materials Div., John A. Roebling's Sons Corp.



C. H. Dewey, named general manager of Republic Steel Corp.'s Northern Ore Mines.



J. R. McVicker, named general manager, Coal Mines, Republic Steel Corp.

H. T. Stoll, named manager, credits, National Steel Corp., Pittsburgh.

M. E. Saxman, named plant manager, Chicago district plant at
(Continued on P. 108)



The answer? **Femco Remote Control**

Wherever crane operation must be coordinated with the operation of floor equipment, you can increase efficiency and save time with a FEMCO Remote Control System.

With this System you can "stretch your craneman's arm," enabling him to select and operate a variety of floor functions from the crane cab. Best known uses of the System are for the opening and closing of soaking pit covers and furnace doors, but it has many other applications.

Coded carrier current is employed, thus permitting the transmission of control impulses over existing power lines. If it is desired to control the same functions from more than one crane, interlocking circuits permit this and, at the same time, prevent interference.

We will be glad to send you full information concerning any application of this FEMCO Remote Control System in which you are interested.

VMA 8707

Femco, Inc. Irwin, Pa.

COMMUNICATIONS: Carrier and wired audio systems. **TELEMETERING:** Flows, pressures and other functions. **MONITORING:** Circuit breakers, valves, pumps, compressors, etc. **REMOTE CONTROL:** Pumps, valves, circuit breakers, cranes, or other moving equipment.



CONVENIENT, QUIET, SAFE

The New Hevi-Duty Electric Resistance Holding Furnace

The holding furnace brings a new degree of speed, convenience and safety in the production of aluminum castings . . . and a new high in metal quality, too. There is no turbulence, no noise and a minimum of dross formation. It holds metal overnight, or over a weekend if necessary. The unit is extremely compact and unusually cool to work with.

Further, it is simple to service. Resistance elements can be replaced while furnace is in operation. If charge freezes due to power failure, it can be reheated without damage to furnace. There are no pots to break or replace. Linings last for years under normal conditions and are standard brick shapes — available locally.

Find out how its quiet efficiency can aid your operation. Call your Hevi-Duty representative or write for Bulletin 150.

- Industrial Furnaces electric and fuel
- Laboratory Furnaces
- Dry Type Transformers
- Constant Current Regulators



(Continued from P. 107)

Lansing, Ill., of Vulcan Mold & Iron Co.; **Arthur Moynihan**, appointed Lansing foundry superintendent; **J. I. Countreman**, named personnel manager.



J. J. Collins, named general manager, Mining Dept., Revere Copper & Brass Inc., New York.

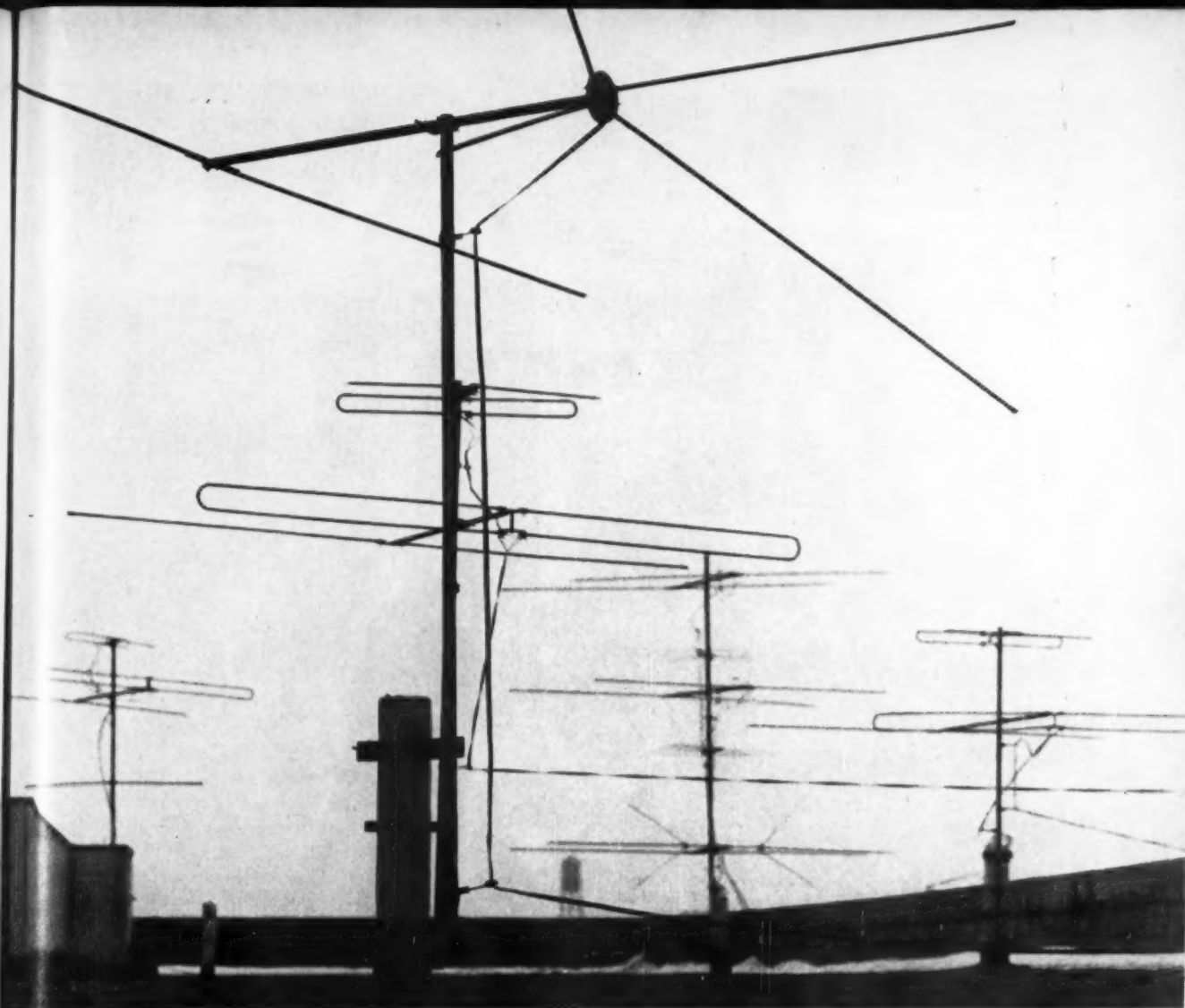
M. E. Capouch, named manager, distribution and availability, American Steel & Wire Div., U. S. Steel Corp.; **W. H. Guterl**, named manager of Marketing, American Steel & Wire Div.



E. R. Humann, appointed director, purchases, Air Reduction Co., Inc.

L. E. Baker, appointed assistant general sales manager, Trent Tube Co., a wholly-owned subsidiary of the Crucible Steel Co. of America.

Robert Knight, named sales service manager, Johnston & Funk
(Continued on P. 110)



WHICH ONES WILL LAST (and last, and last!)? THOSE MADE OF WEIRKOTE® ZINC-COATED STEEL!

Steel tubing that's protected against corrosion even under the most trying circumstances.
Steel tubing that's easily fabricated to meet the most exacting specifications.

That's what you get in tubing made of Weirkote zinc-coated steel!

Weirkote's zinc coating—applied by the continuous process throughout, and so uniformly that every square inch is protected—is skin-tight. There's absolutely no flaking or peeling no matter how tortuous the crimping, twisting or other stresses of fabrication. In fact, Weirkote can be worked to the very limits of the steel itself.

The use of Weirkote can eliminate the need for any further coating process after fabrication. Its tight zinc coating is completely intact and remains so during fabrication and on the job. Weirkote zinc-coated steel tubing is particularly suited for jobs where weather is a factor to be taken into consideration.

Take a good long look at the possibilities and advantages of using Weirkote zinc-coated steel to meet your tubing requirements. For the complete story on Weirkote and how it can help you, write Weirton Steel Company, Dept. A-7, Weirton, West Virginia.



**WEIRTON STEEL
COMPANY**

WEIRTON, WEST VIRGINIA

a division of

NATIONAL STEEL CORPORATION



since we switched to Wheelabrator® Steel Shot™

A single pound of Wheelabrator Steel Shot, as shown in the hands of Mr. R. L. Smith, Forging Engineer at the Broderick Co., Division of Harsco Corp., Muncie, Indiana, cleans the forgings shown in the large pile. The same quantity of malleable abrasive formerly used could clean only the quantity represented by the small pile.

"The same cleaning production is handled in half the former time with 57% less abrasive," says Mr. Smith. "While cleaning production increased from 275 tons to 642 tons of forgings per ton of shot used, abrasive costs were reduced 43%."

And as a bonus benefit, blasting with Wheelabrator Steel Shot has improved the surface appearance of Broderick's forgings, adding to their customer's satisfaction.

Your Wheelabrator Abrasive Engineer will help you make similar savings in your blast cleaning operations. Write for details of this blast cleaning efficiency engineering service.

WHEELABRATOR

C O R P O R A T I O N

ABRASIVE DIVISION

510 South Byrkit Street Mishawaka, Indiana

Canadian Offices: Scarborough (Toronto) — Montreal

World's Largest Manufacturer of Steel Abrasives

(Continued from P. 108)

Metallurgical Corp., Wooster, O., a subsidiary of Mallory-Sharon Metals Corp.

A. E. Sims, appointed personnel director, Clark Equipment Co.'s Transmission Div.



H. F. Schulte, appointed chief engineer, Wheelabrator Corp., Mishawaka, Ind.

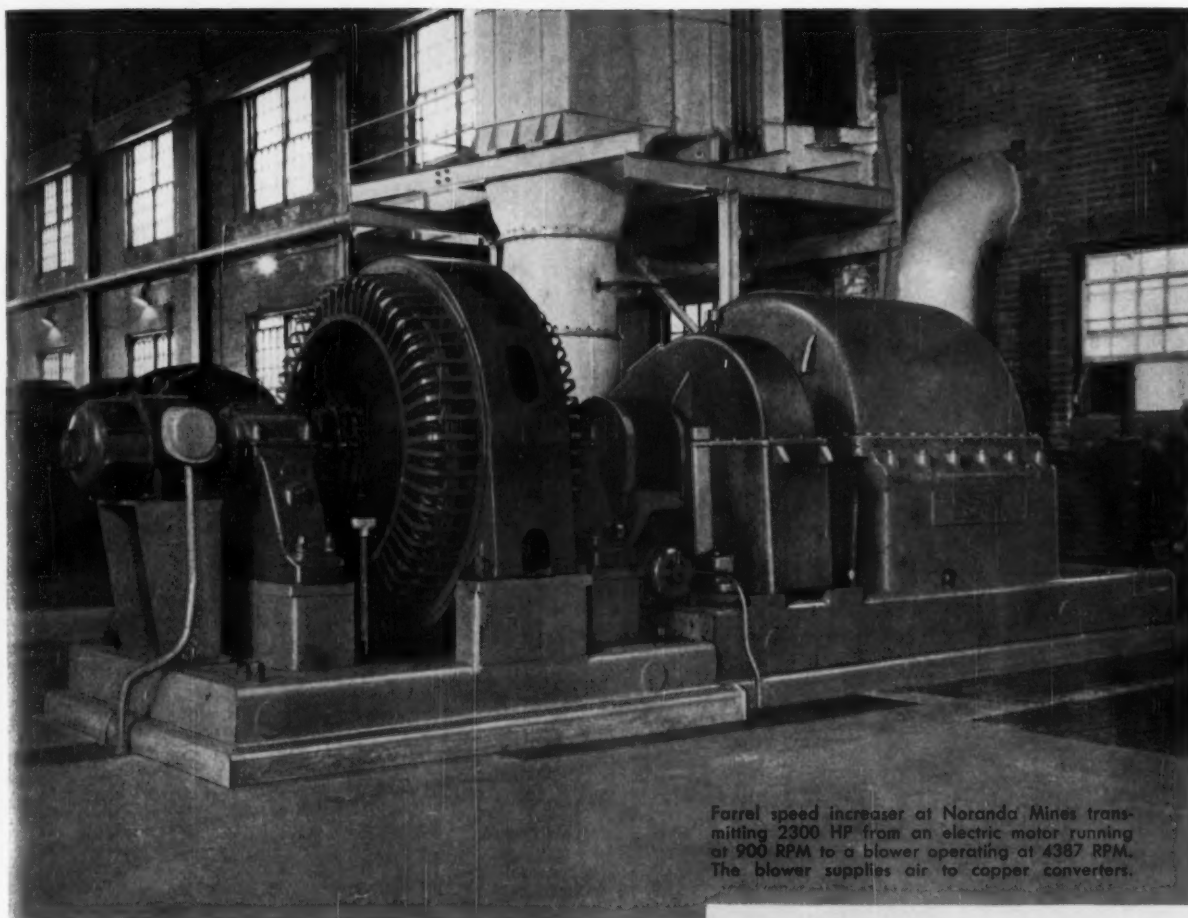
P. R. Gravenstreter, named district engineer, Detroit district office, Clark Controller Co.

W. W. Davis, appointed pre-stress planning engineer, Leschen Wire Rope Div., H. K. Porter Co., Inc.

J. C. Ruptic, appointed a sales representative, Welding Products Div., A. O. Smith Corp., Milwaukee.



K. H. Carlson, appointed technical manager, specialty steels, Latrobe Steel Co., Latrobe, Pa.



Farrel speed increaser at Noranda Mines transmitting 2300 HP from an electric motor running at 900 RPM to a blower operating at 4387 RPM. The blower supplies air to copper converters.

"Both speed increasers have given us very satisfactory service"

These are the words of L. O. Cooper, plant engineer for Noranda Mines, Limited, Noranda, Quebec. He is referring to their two Farrel gear units, used to transmit power from electric motors to high-speed blowers.

Farrel gear units have the benefits of sound engineering, skilled workmanship, high quality materials and years of experience in furnishing speed increasing units which have provided "very satisfactory" service for an indefinite period. In fact, since they were first developed in 1932, not one has ever been known to be replaced.

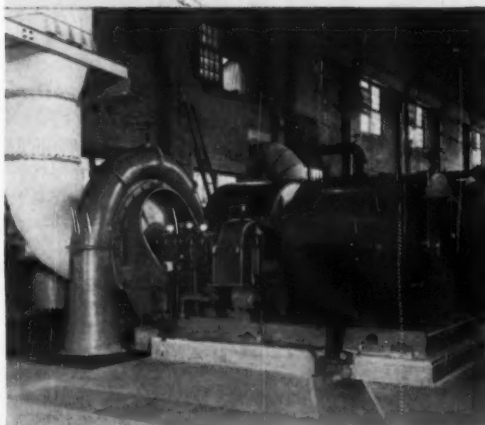
For full details of Farrel speed increasers, send for a copy of bulletin 451.

FARREL-BIRMINGHAM COMPANY, INC. ANSONIA, CONNECTICUT

Plants: Ansonia and Derby, Conn., Buffalo and Rochester, N. Y.
Sales Offices: Ansonia, Buffalo, Boston, Akron, Ann Arbor (Mich.),
Chicago, Minneapolis, Los Angeles, Salt Lake City, Tulsa,
Houston, Fayetteville (N. C.)
European Office: Piazza della Repubblica 32, Milano, Italy



NORANDA MINES, LTD.



This 920 HP unit increases speed from 1450 to 4087 RPM. The blower furnishes secondary air to a copper reverberatory furnace.

New series of precipitation-hardenable 18-8 stainless alloys combines corrosion resistance, high hardness, strength at high temperatures, and machinability. Pick the combination of properties best suited to fulfill the needs of *your* application.

New stainless steel alloys by Cooper Alloy

Where can you use them? Cooper Alloy Corp., whose name has for the past 36 years been associated with outstanding developments in casting of stainless steel, now brings American industry another unusual first: a series of 18-8 stainless alloys which combine corrosion resistance, high hardness, high strength and machinability. They maintain these properties even at temperatures up to 1400°F. In particular, they resist corrosion of the pitting type, and the detrimental erosion effects of velocity and suspended abrasives which accentuate corrosion damage.

Prior to the appearance of this new series, the physical properties of stainless alloys which afforded corrosion resistance were precisely those which reduce hardness, and vice versa. Cooper Alloy research has found a way to combine these desirable properties,

filling a hitherto existing void in the area of high strength plus high corrosion resistance.

Details of the new Cooper Alloy PH-55 alloys are being reported in the technical press. The following information, therefore, is presented as a quick summary. There are three alloys in the series, as follows:

PH-55A is a high-strength, high-hardness alloy designed for corrosion-erosion and corrosion-abrasion conditions. Outstanding pitting resistance.

PH-55B is a high-strength alloy of greater ductility and lower hardness than "A", for corrosion resistance of parts subjected to a combination of stress and shock.

PH-55C has greater corrosion resistance, hardness, and strength than "A", but less ductility and shock resistance.

All PH-55 Alloys have higher strengths in the 1200-1400°F. range than do most other corrosion-resistant precipitation-hardening alloys, and also maintain their hardness even after prolonged exposure to these high temperatures.

Available in variety of forms: Primarily are intended to be produced in cast form. Rolled bar stock has, however, been made experimentally. PH-55A is the most readily rolled or forged material; "C" can be worked readily but with slightly greater difficulty, and while "B" can be produced in the wrought form; some care is required. Commercial production of the wrought form is at present under consideration.

Corrosion Resistance: Generally superior to the 316 alloys in all corrosive media except hot conc. HNO_3 . This fact, coupled with other outstanding



Quen



Precipit

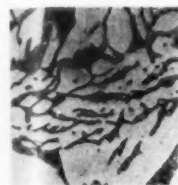
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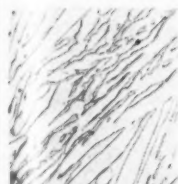
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MICROSTRUCTURE OF COOPER ALLOY PH ALLOYS

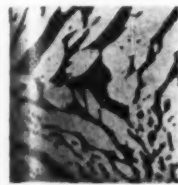
Mag. 250 X
Etchant: 10% Ammonium
Sulfate Electrolytic



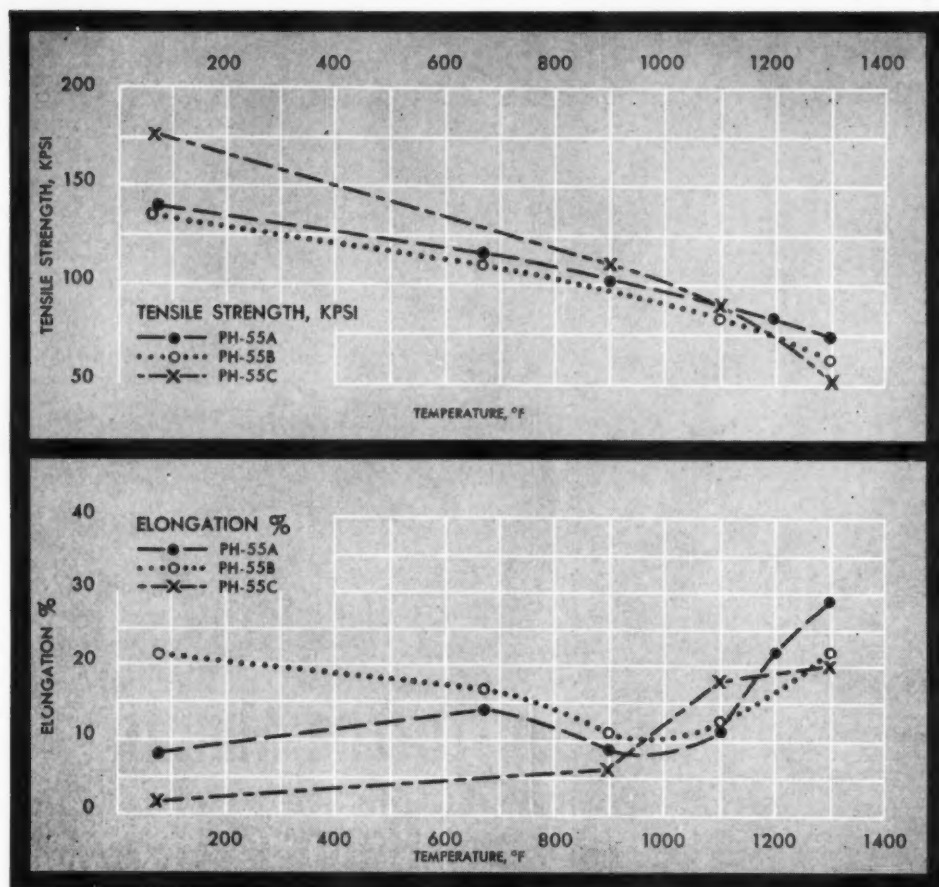
As Cast



Quench Annealed



Precipitation Hardened



Balanced physical properties—Alloy "A" has good hardness and strength, even at elevated temperatures, plus a moderate amount of ductility and toughness. "B", though less hard, exhibits improved ductility and toughness at practically the same strength level. "C" provides maximum combination of hardness and strength at room temperatures when lower ductility can be tolerated.

properties of erosion resistance, high hardness, and high strength, opens many fields of application in chemical processing equipment.

Alloy "A" Resistant to Pitting Corrosion: Pitting, which results in highly localized penetration of the metal without any great overall corrosion, may cause failure through perforation and leakage. This type of failure is especially prevalent in hot aqueous solution.

"A" and "C" Resist Erosion-Corrosion: Another common form of accelerated failure results from the high velocity of the corrodant, such as is found in pumps, and here failures are from corrosion-erosion action, often intensified by the presence of an abrasive. The high hardness and good corrosion resistance of alloys "A" and "C" make these alloys well suited to resist this type of corrosion failure.

Heat Treatment Easy: Alloys "A", "B", and "C", when in the annealed condition, are easily machined, and can be welded when solution-annealed by using rod of similar composition by the shielded-arc technique. Hardening after machining is simple, consisting of a low-temperature anneal of 900°F. for 8 hours, followed by furnace or air cooling.

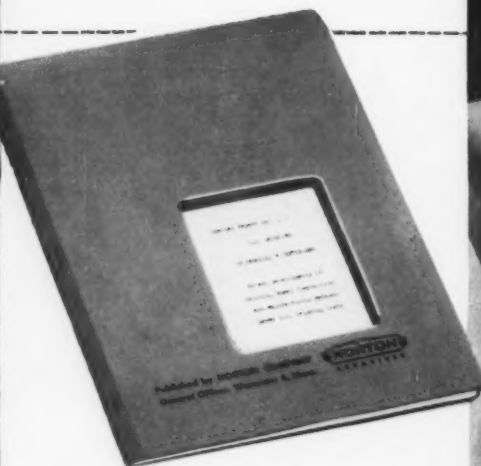
Where can YOU use these alloys? The high hardness and resistance to corrosion-erosion and abrasion of "A" and "C" indicate their use as pump castings and impellers, and in fact any place where velocity, abrasion, and wear are encountered under highly corrosive conditions. "A"'s extreme resistance to pitting corrosion especially adapts it to use in marine hardware, and in handling of bleach solutions in dyeing and textile plants. "B", with its high strength and ductility, lends itself to

vibratory and highly stressed corrosive applications in such equipment as disintegrators and pressure reactors. Patents have been applied for or granted on the PH series of alloys.

The exceptional strength of all three alloys, especially "A", in the 1100-1400°F. range, suggests use in hot missile and supersonic aircraft parts. To date a number of "A" alloy applications in this field have been standing up remarkably well, and it is predicted that quite a few previously insurmountable corrosion problems may be licked through the use of these new alloys.

For further information that may help you solve your corrosion-resistant problems, write to Cooper Alloy Corp., Hillside, N.J.

COOPER ALLOY



Get this New,
Up-To-The-Minute
Report
filled with

Inside Facts on Outside Grinding

A Report on O.D. Grinding, by Norton specialists, describes "tricks of the trade" that get the most out of cylindrical and centerless grinders . . . provides on-the-job performance of different grinding wheels . . . and analyzes the following highly efficient abrasives and bonds.

Abrasives. 44 ALUNDUM* (aluminum oxide) abrasive, an ideal cost-cutter for many O.D. jobs. 32 ALUNDUM abrasive, first choice for grinding various materials, including harder steels. The other time-tested Norton ALUNDUM abrasives are also included. And 37 and 39 CRYSTOLON* (silicon carbide) abrasives are best

suited for grinding cast iron, non-ferrous metals, carbides and other materials.

Bonds. G bond, biggest advancement in vitrified bonds, gives best results in most O.D. jobs, particularly crush-truing. Vitrified BE bond is another widely used favorite. Where CRYSTOLON abrasive is required, K bond is outstanding. B11 resinoid bond excels in uniformity with both ALUNDUM and CRYSTOLON wheels. For centerless feed wheels, R51 rubber bond assures complete regulating control without slippage.

Your Norton Man will be glad to work with you in solving O.D. prob-

lems, to assure you the lowest cost-per-piece produced. How this expert can bring you the value-adding, profit-boosting "Touch of Gold" is stated in the Report, available from your local Norton Representative — and as near as your phone. NORTON COMPANY, General Offices, Worcester 6, Mass. Plants and distributors around the world.

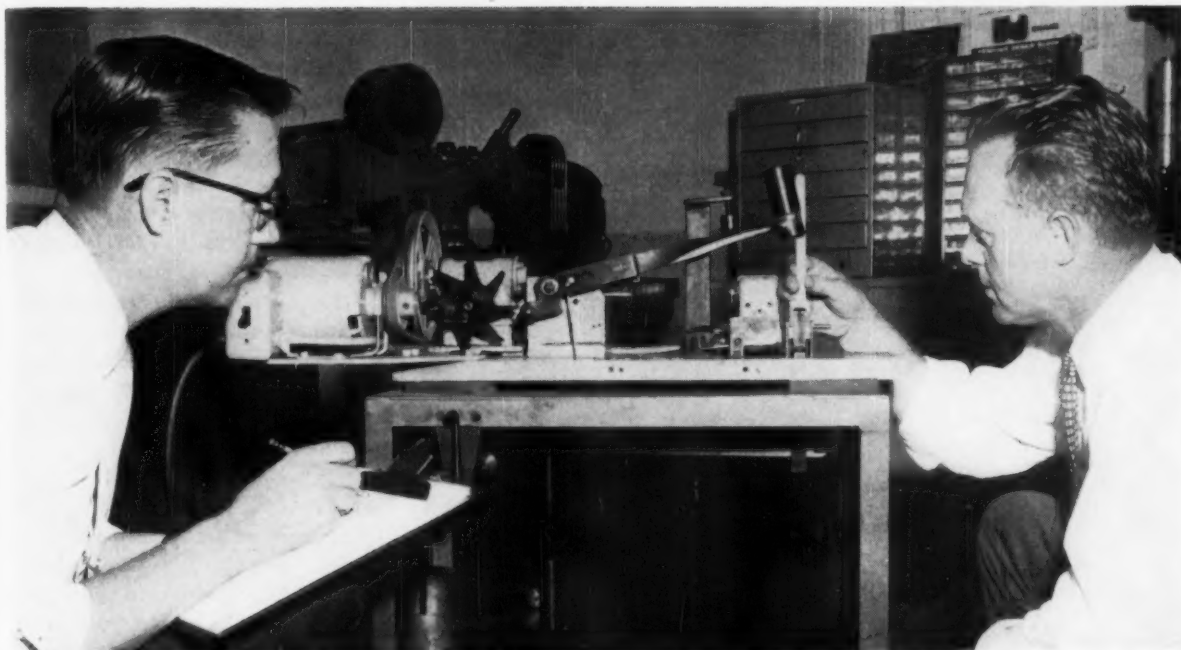
*Trade-Marks Reg. U. S. Pat. Off. and Foreign Countries



W-1201

Making better products . . . to make your products better

NORTON PRODUCTS Abrasives • Grinding Wheels • Grinding Machines • Refractories • Electrochemicals — DENR-MANNING DIVISION Coated Abrasives • Sharpening Stones • Pressure-Sensitive Tapes



TESTING FIRST: New designs and materials get complete tests. C. Graverson (left), Metallurgist, and J.

Ross, Assistant Chief Engineer, at Omark check fatigue strength of drive links of special steel.

How Quality Control Leads To Better Product Design

By H. P. Blood—Quality Control Engineer, Omark Industries, Inc., Portland, Ore.

As product design changes, so does the need for quality.

That's what happened to the chain saw: a lighter design, but a boost in power and chain speeds. Result—greater stress on quality for saw chains.

■ Ten years ago, the typical chain saw was a rather bulky affair weighing about 45 lb. It was about 4 hp, operating at 700 sfpm.

Today, the saws most popular in timber harvesting weigh about 25 lb, are direct-drive rather than gear-

driven, and are about 6 hp. The direct-drive pushes chain speeds up to 4000 sfpm.

This tremendous advance in chain-saw power and speed is of value to the operator only if the saw chain, the saw bar, and the sprocket stand up. Omark at its Oregon Saw Chain Div. has kept pace with these saw developments through its program of quality control.

A Total Concept—The basic principle underlying Omark's efforts to provide users with quality chain is that defined as "total quality control." It starts with the de-

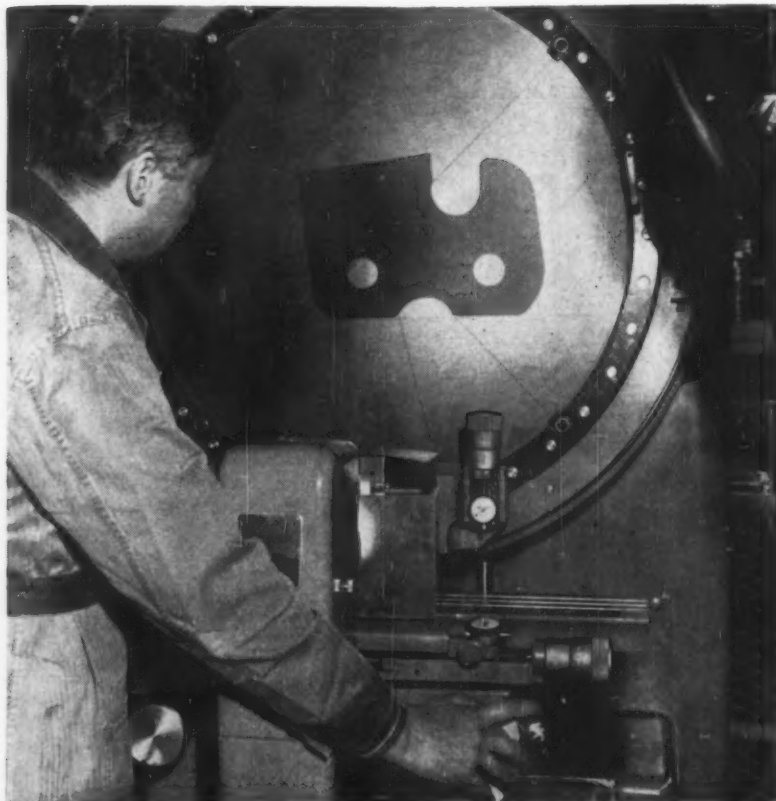
sign of chain and ends only when the chain is in the hands of a user who remains satisfied.

There are four main areas in the program: the first is design control and the second is incoming material control. The third, and usually the most intensive, is in-process control. Fourth is the area of special process studies, growing more important daily.

In order to implement its program of total quality control, Omark develops specific projects in a quality control steering committee. The steering committee acts mainly as a consulting group to



INCOMING CHECKS: Air gage shows diameter of incoming rivet rod. Tolerances are specified to ± 0.00025 in. to control diameter of rivets.



QUALITY IN PROCESS: Optical comparator magnifies outline of cutting link for check on critical dimensions of precision parts.

identify major quality control projects.

Committee Action—It gives specific direction to fact-finding committees, which are temporary groups, usually representing production, engineering, inspection, and quality control. These fact-finding committees are given specific assignments by the steering committee.

Their mode of action is to investigate, gather facts and statistical data, and report their findings in writing to the steering committee. Full minutes are kept of all committee meetings.

Neither the steering committee nor the fact-finding committees are empowered to act in changing any design, procedure, or production process. It's the Omark line organization which institutes and carries out changes which appear advisable.

Evaluate First—No Oregon chain is ever manufactured until the proposed design is carefully evaluated by the manufacturing staff. This assures a product which will be as defect-free as possible prior to the start of production.

Some of the technical tools used are: process capability studies, tolerance analysis, pre-production runs for quality survey purposes, and statistical evaluation of process variables.

Before a chain is added to the product line, design is carefully checked by the test section of the engineering department. Tests of sample chains involve cutting specific types and diameters of logs. Careful records are kept of cutting efficiency, wear, fatigue strength, and other variables of known importance.

Check Material—All saw-chain strip and rivet steel go through careful checks. Tests involve chemical analysis, surface finish, machinability, and heat-treat response, as well as dimensional checks. Purchased parts and accessories are inspected using statistical sampling plans for

dimensional and metallurgical properties.

Omark's purchasing department keeps constant contact with suppliers. Vendors are informed immediately of any departure from specified quality levels, often with suggestions for possible improvement.

At the heart of the total quality control program is careful control of all manufacturing processes. There are over 60 points of inspection in the manufacturing cycle of saw chain. Two main phases of process control are dimensional control and metallurgical control.

Control Dimensions—Tight manufacturing tolerances make the saw chain a precision product. Dimensional control is achieved through the use of precise measuring equipment, carefully maintained measurement standards, and the use of statistical probability.

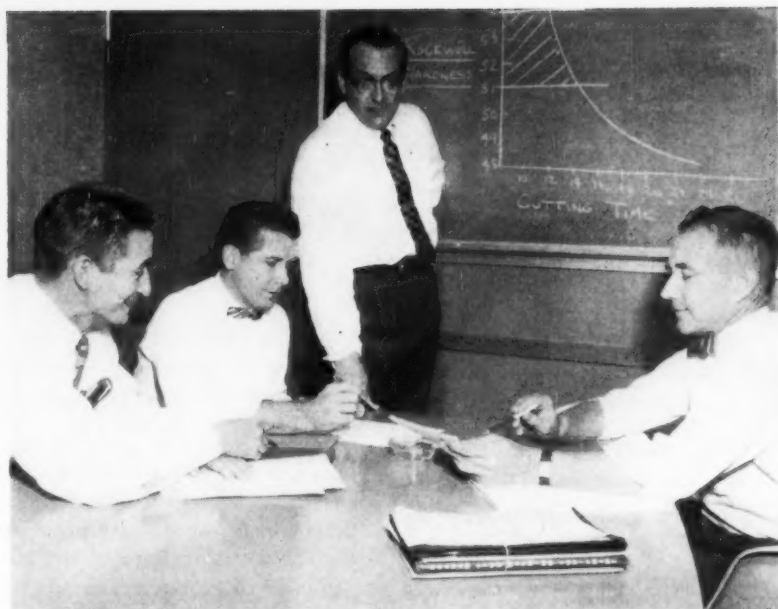
In the area of metallurgical control, or the control of the non-dimensional aspects of chain quality, it's an even more challenging prospect. The production-line organization at Omark is proud of its accomplishments in producing the less tangible quality characteristics, such as hardness and ductility.

Through use of statistical control techniques, heat-treat variation is detected at the time it occurs. It's a control system that prevents production of large quantities of discrepant parts to be detected only by "after-the-fact inspection."

Statistics Count — Many of Omark's production processes are high-volume, automated, high-speed operations. These processes lend themselves to statistical quality control. The techniques are comparatively simple, and are in daily use by non-mathematical operators.

An example is the induction heat-treating of chain rivet flanges. The saw-chain rivet has a hardened flange which forms a bearing for the pivoting action of the drive link.

It must also have hubs which are soft enough to be spun into the



STEERING COMMITTEE: H. P. Blood (left), author; R. Carlton, Chief Engineer; E. Skralskis, Assistant General Manager, and Everett Lillig, Production Manager, discuss cutter hardness vs cutter efficiency.

counter-sunk cutters and tie straps. This problem prompted the design of a high-frequency, induction-hardening machine, which heats the rivet flange to a specified depth, without heating the hub.

Sampling Hardness—Each machine can produce in excess of 100,000 rivets per day. Since each rivet cannot be checked individually for hardness, samples of five consecutively-produced rivets are periodically checked for hardness. Values are recorded on a quality control chart for averages and ranges.

If the average hardness of the five rivets is between specified limits, and if the range between highest and lowest values is below a specified limit, the operation is considered "in control." These limits are probability limits derived statistically. They indicate that a process is being influenced only by chance factors as long as the values are within tolerances.

When values are found beyond these limits, it indicates that something untoward has occurred. Then the operator or foreman immediately looks for an assignable cause.

This same approach is followed in other processes.

Looking Ahead — Another important aspect is found in the area of special process studies. This scientific approach is used in the broad area of research and development with such statistical techniques as tests for significance, multiple correlation and analysis of variance.

"Total quality control is essentially a scope concept," asserts John Gray, President and General Manager of Omark. "It is the understanding that real quality control cannot be accomplished by concentrating on inspection alone, or design alone, or statistical analysis alone, important as each of these elements is. It is the recognition by all in the company that the determination both of quality and quality cost actually takes place throughout the entire industrial cycle."

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Four New Stainless Alloys

Precipitation Hardening Links Strength, Corrosion Resistance

By Norman S. Mott—Chief Research Metallurgist, Cooper Alloy Corp., Hillside, N. J.

All of these new materials can be readily cast—some can be rolled and forged.

By combining high strength with excellent corrosion resistance, they clear the way for many applications that existing alloys can't handle.

■ As a user, you know that the choice of a particular grade of stainless steel often involves a compromise. If you want excellent corrosion resistance, you choose one alloy. If you want exceptional strength, you choose another. It has been virtually impossible to obtain a single alloy that combines the best features of strength plus corrosion resistance.

Now a new series of molybdenum-containing, 18-8 type alloys fills the gap. Available in cast forms, the alloys were developed by Cooper Alloy Corp., Hillside, N. J. They provide higher strength and hardness with greater resistance to corrosion (especially pitting cor-

rosion) and the erosive effects of velocity and suspended abrasives which intensify corrosive damage.

Four Alloys—At elevated temperatures (1000°-1400°F), the new steels offer higher strengths than can be obtained with existing precipitation hardenable alloys of the corrosion resisting type. The new series is to be known as the "PH-55 alloys."

First of this series is PH-55A. It has high strength, high hardness, and excellent corrosion-erosion and corrosion-abrasion resistance. Its resistance to pitting makes it ideal for applications where Type 316 will not stand up.

PH-55B is also a high strength alloy but has greater ductility and lower hardness. It is particularly suited for applications where corrosion-resistant parts are subject to stress and shock.

A third alloy is PH-55C. Better than PH-55A in corrosion resistance, it has higher hardness and strength with slightly less ductility and shock resistance.

High Hardness—PH-55D is the fourth alloy in the series. Very similar to PH-55A in composition and corrosion resistance, it surpasses it in hardness. This very high hardness results in some brittleness. In this respect, it is more closely related to tool steel.

The chemical compositions of these alloys in the cast condition are listed in Table 1. The mechanical properties are given in Table 2. Of particular interest is the fact that these materials have higher strengths in the 1200°-1400°F range than most corrosion-resisting, precipitation-hardening alloys. Also, they are able to retain their "hot hardness." The data in Table 3 shows that PH-55 alloys do not soften even after extended exposure to temperatures up to 1400°F.

Wrought Forms—Although the PH-55 series are primarily produced in the cast form, rolled bar stock has been made of the A and C alloys on an experimental basis. Of the three alloys, PH-55A is most readily forged and rolled. The C alloy is a little more difficult to hot work, while the B alloy is most difficult.

The ductility of the wrought alloys is generally superior to the cast materials. At equivalent hardness levels, however, the strength of wrought and cast material is comparable.

PH-55A shows exceptional resistance to pitting corrosion. Pitting involves a highly localized penetration of metal rather than overall corrosion. It is a type of failure frequently encountered with hot salt solutions, hypochlorite bleaches and sea water.

Table 1: Composition Ranges of PH-55 Alloys

	PH-55A	PH-55B	PH-55C	PH-55D
	Composition, pct			
C	0.05 max.	0.05 max.	0.05 max.	0.05 max.
Cr	19.5-20.5	19.5-20.5	19.5-20.5	18-21
Ni	8.5-9.5	8.5-9.5	8.5-9.5	9-12
Si	3-3.75	1.25-1.75	3.25-3.75	3-5
Mn	1 max.	1 max.	1 max.	1 max.
Cu	—	3.25-3.75	2.75-3.25	—
Mo	3.75-4.25	4.75-5.25	3.75-4.25	3.75-4.25
Other	—	—	—	Cb.75-1.25 N ₂ .06-.15

Table 2: Mechanical Properties of PH-55 Castings

	PH-55A	PH-55B	PH-55C	PH-55D
Hardness-Solution Annealed, Bhn	241-285	217-235	269-331	286-418
Precipitation-Hardened Condition, Bhn	311-388	248-302	363-477	418-600
Charpy Impact Values (Keyhole), Precipitation-Hardened Condition	4	35	3	—
Ultimate Tensile Strength, psi	139,000	139,000	185,000	—
Yield Strength, psi	106,000	105,000	150,000	—
Elongation, pct	8	21	2	—
Reduction of Area, pct (PH Condition)	6	18	2	—

At 900°F

Ultimate Tensile Strength, psi	102,700	83,300	108,500	—
Yield Strength, psi	58,000	57,500	57,500	—
Elongation, pct	9	11	6	—
Reduction of Area, pct (PH Condition)	13	9	9	—

At 1300°F

Ultimate Tensile Strength, psi	75,400	63,500	50,100	—
Yield Strength, psi	38,000	32,500	33,000	—
Elongation, pct	29	22	20	—
Reduction of Area, pct (PH Condition)	42	24	38	—

Pump Wear—Another common type of accelerated failure results from the high velocity of the corrodent. Such failures are common in pumps. The combined corrosion-erosion action is often intensified by the presence of an abrasive. To resist this type of failure, the good corrosion resistance and high hardness of PH-55A and PH-55C are especially recommended.

The mechanism of hardening the PH-55 alloys involves a combination of hardening phenomena. To some extent, there is true precipitation hardening. At the same time, a finely-dispersed sigma phase is formed in the precipitation hardened condition. As solution annealed, these alloys are austenitic.

Because they are austenitic types, the PH-55 alloys have several advantages. The presence of a dispersed ferrite phase results in a reduction of intergranular corrosion tendency. After welding, carbides precipitate preferentially in the discontinuous ferrite grains rather than at the grain boundaries. There is no carbide "network."

Retain Strength—Another advantage: these alloys are highly resistant to stress corrosion. If stress corrosion cracks form in the austenite grains, their propagation is arrested by the ferrite pools. Also, the mechanism of hardening is such that the precipitate does not dissolve or coalesce even at temperatures as high as 1400°F. Thus high strength and high hardness are retained.

Lastly, these alloys do not require alloy starvation in order to obtain hardenability. For this reason, their general resistance to corrosion is better. The microstructure of precipitation hardened cast material is shown in Fig. 1.

Heat treatment of the PH-55 series consists of heating to 2050°F for 1 hour plus 1 hour per inch of maximum cross-section. After quenching in water, the metal achieves maximum softness for cold working or machining.

Easily Machined—In this condition, alloys A, B, and C are readily machined. No difficulty is encountered in turning, drilling, or threading. The alloys may be welded by the shielded-argon technique, using rod of similar composition. After

Table 3: Effects of Aging on Hardness

Aging Treatment	PH-55A BHN	PH-55B BHN	PH-55C BHN	PH-55D*
8 Hrs at 900°F	352	262	387	—
50 Hrs at 900°F	382	293	418	—
50 Hrs at 1200°F	340	248	387	—
50 Hrs at 1400°F	402	293	430	—

* Not used at high temperatures.

Table 4: Mechanical Properties of Wrought PH Alloys

	PH-55A	PH-55C
Ultimate Tensile Strength, psi	149,600	161,600
Yield Strength, psi	114,000	120,200
Elongation, pct	14	15
Reduction of Area, pct	21	20
Hardness, Bhn	341	331

welding, a re-solution anneal is recommended for uniformity of properties and maximum corrosion resistance.

These alloys are hardened by holding at 900°F for 8 hours, followed by furnace or air cooling. If desired, metal discoloration can be

easily removed by an acid dip. A recommended dip consists of 2 pct hydrofluoric acid, 15 pct nitric acid, and the balance water. The solution should be used warm and should be followed by a thorough hot-water rinse.

If appearance is not important,

pickling is unnecessary. The slight discoloration that results from heat treating has no detrimental effect on corrosion resistance. Castings may be cleaned and pickled after solution annealing in the same manner as any other chromium-nickel alloy.

As for possible application of these materials, the unique properties of alloys A and C appear to be ideal for pump casings and impellers. This is particularly true of applications involving not only corrosion, but also velocity, abrasion, and wear.

Because PH-55A resists pitting corrosion, it is suitable for use in marine hardware and for handling bleach solutions in the textile industry. The combination of high strength and ductility found in PH-55B recommend it for vibratory and highly stressed corrosive applications. Examples can be found in such equipment as disintegrators and pressure reactors.

Thanks to their hot strength, some of these alloys should also prove useful in missile and supersonic aircraft applications.

Those experimental field applications that have already been tried have met with remarkable success. Based on these results, it is fair to predict that many apparently insurmountable corrosion problems may be solved with the PH-55 alloys.

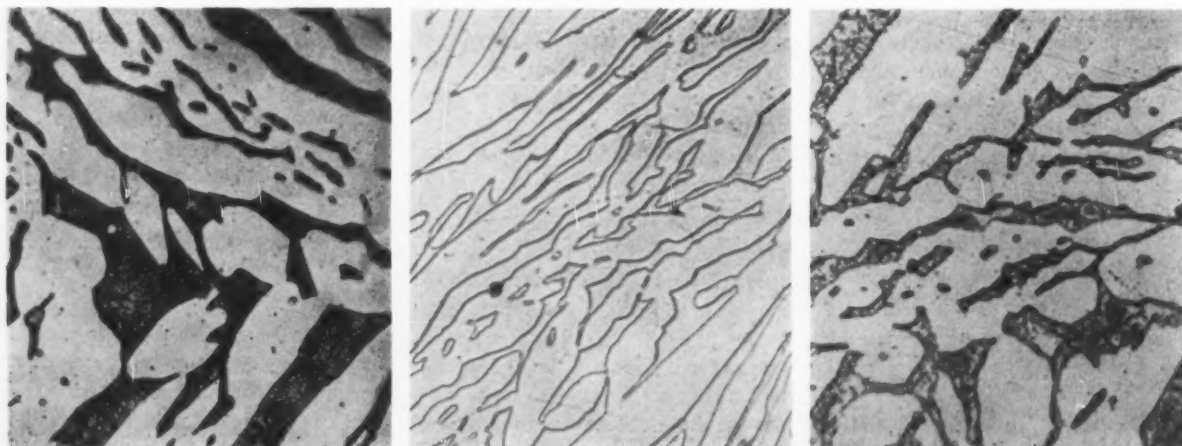


FIG. 1: Microstructures of PH-55B alloy are shown for three conditions: as-cast (left), annealed (ctr), and pre-

cipitation hardened (right). Hardened, sigma precipitates in discontinuous ferrite grains. Mag.: 400X.

Table 5: Corrosion Rates of PH Alloys

		PH-55A	PH-55B	PH-55C	CF-8M (316)
		Penetration, inches per month			
Sulfuric Acid					
At Room Temp.	Concentration, pct	0.00156	0.00007	0.00003	0.1130
	50	0.00156	0.00007	0.00003	0.1130
	65	0.00152	0.00009	0.00017	0.0258
	78	0.00031	0.00005	0.00002	0.00683
At 176° F	10	0.00193	0.00005	0.00001	0.00833
	20	0.0371	0.00922	0.00004	0.0400
	30	—	—	0.01247	—
	78	0.0114	0.01095	0.00051	0.1250
	93	0.00373	0.00098	0.00005	0.0217
At Boiling Point	1	0.00011	0.00069	0.00003	0.00455
	2	0.00440	0.00563	0.00010	0.01250
	5	0.02261	0.02426	0.00368	0.0220
Hydrochloric Acid					
At Room Temp.	1	0.00013	0.00004	0.00004	0.0011
	2	0.00118	0.00004	0.00003	—
	5	0.04324	0.00120	0.01260	0.0414
At 176° F	½	0.00037	0.00023	0.00005	—
	1	0.00476	0.00242	0.00014	0.0070
	2	0.1298	0.01250	0.00259	—
At Boiling Point	½	0.00088	0.00006	0.00011	—
	1	0.01341	0.02258	0.00449	0.2180
Nitric Acid					
At 176° F	50	0.00026	0.00020	0.00028	—
	65	0.00043	0.00026	0.00045	—
At Boiling Point	20	0.00039	0.00033	0.00257	—
	65	0.00654	0.01062	0.00776	0.0019
Acetic Acid					
At Boiling Point	100	0.00003	0.00001	0.00004	0.00015
Calcium Hypochlorite					
At Room Temp.	Sat.	0.00002	0.00734	0.00003	—
Ferric Chloride					
At Room Temp. + .1 pct HCL	10	0.00004	0.0654	0.0180	0.0277
Phosphoric Acid					
At Boiling Point	40	0.00014	0.00019	0.00012	—
	85	0.2450	0.2067	0.0855	—



OFTEN NEEDED: New set has blocks needed to measure O-ring grooves, snap ring grooves, and keyways.

Develop New Gage Block Set Especially for Shop Use

Demands for closer tolerances often require gage-block accuracy in machine setups and production inspection. Here's how to get it—economically.

■ A new type of precision gage-block set has been designed specifically for shop use.

It contains only 54 pieces (56 counting two wear blocks) yet it provides much-needed dimensions for shop inspection and machine setup work that could previously be made only with 121-piece sets.

Developed by The DoALL Co., Des Plaines, Ill., the new set provides direct measurement of fractional dimensions down to 1/64 in., measurement by thousandths from 0.020 in., and measurement by "tenths" from 0.120 in. Small but practical, it will measure all stand-

ard snap ring grooves, O-ring grooves, and keyways.

Meets Accuracy Demand—Gage blocks are playing a new role in modern industry, DoALL officials say. Today's demands for more accuracy in manufactured products is virtually obsoleting go and no-go gages which show only that a part is in or out of tolerance.

Today, they say, the quality control man wants to know where successive parts lie within the tolerance range. Knowing this, tool replacements and machine adjustments can be anticipated. Such moves not only cut scrap losses, they also produce more accurate workpieces without increasing machining costs.

Use Blocks Directly—In many cases, gage blocks are being brought out of gage-inspection rooms to make these scrap-prevention mea-

surements on the shop floor. Used directly in this way, the blocks offer still another advantage: they reduce errors that often result when gaging requires various transfers of measurements.

On the other hand, when gage block sets are available for direct production inspection, they need only be calibrated periodically with a master set to insure their accuracy.

Then, too, it's only a step from production measurement with gage blocks to their growing use in setup work. According to DoALL many companies now recognize these blocks as their fastest, most accurate means for setting both machines and cutting tools.

New Dimensions Needed—But this combination use of gage blocks—to set up machines and also check their output—also brought a

heavy demand for blocks with fractional and other small dimensions.

The necessary combinations of block sizes for shop use were not available with small sets that were simply trimmed-down versions of larger sets. To make up these fractional and other small dimensions often called for the use of 121-piece sets, which are really too costly for shop work.

To correct this situation, DoALL studied shop use of gage blocks from a statistical, most-needed-sizes point of view. The study showed that a certain 54-piece combination would actually produce more of the often-used dimensions than the standard 81-piece set developed over 40 years ago.

Many Small Sizes—Actually, the company says its new set (designated No. 56-R) is second only to the 121-piece combination in the number of dimensions that can be made. In certain ranges — one hundred thousandths, thousandths, and tenths of thousandths — it actually exceeds the 81-piece set. Moreover, it does this without omitting any other ranges of dimensions.

No. 56-R sets come in all grades: AA, A+, A, and "Shop Blocks."

How Gage Block Sets Compare

NO. 56 R SET

.010
.020, .021, .022, .023, .024, .025, .026,
.027, .028, .029, .030

.1000, .1001, .1002, .1003, .1004, .1005,
.1006, .1007, .1008, .1009
.101, .102, .103, .104, .105, .106, .107,
.108, .109, .110
.120

.130

.140

.160, .170, .180, .190
.150, .200, .250, .300, .400, .500, .750

1.000, 2.000, 3.000
.015625, .03125, .046875, .125,
.050 (2) Wear Blocks

STANDARD 81 PIECE SET

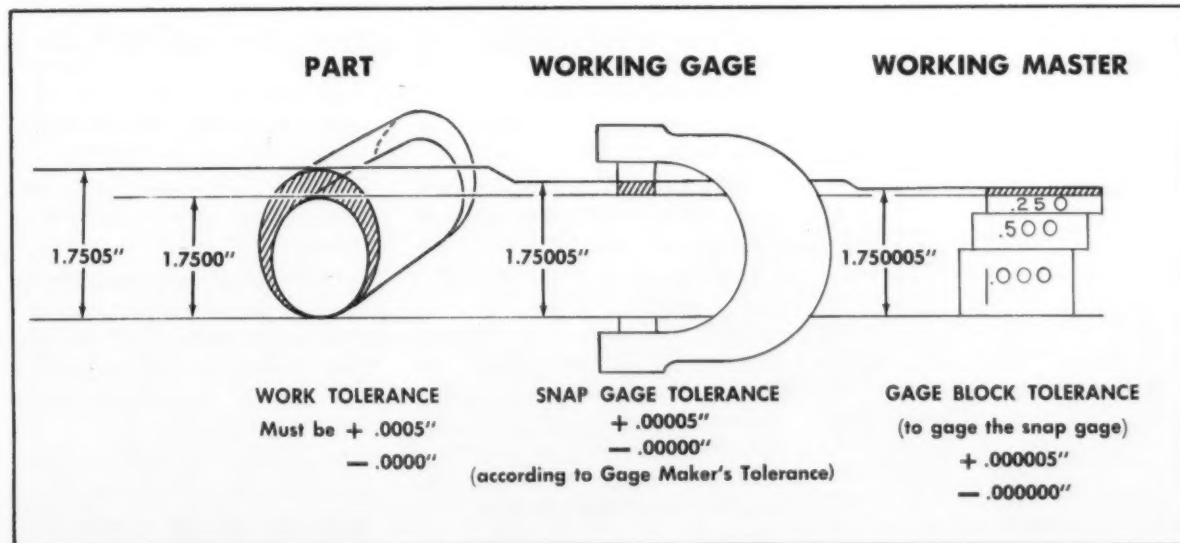
.050
.1000, .1001, .1002, .1003, .1004, .1005,
.1006, .1007, .1008, .1009
.101, .102, .103, .104, .105, .106, .107,
.108, .109, .110
.111, .112, .113, .114, .115, .116, .117,
.118, .119, .120, .121, .122, .123
.124, .125, .126, .127, .128, .129, .130,
.131, .132, .133, .134, .135, .136
.137, .138, .139, .140, .141, .142, .143,
.144, .145, .146, .147, .148, .149

.150, .200, .250, .300, .350, .400, .450,
.500, .550, .600, .650, .700, .750, .800,
.850, .900, .950
1.000, 2.000, 3.000, 4.000

Ranges of Gage Block Sets

	36 PIECE SET	81 PIECE SET	NO. 56-R
Low limit of range in .0001 in.	.3000	.2000	.1200
Low limit of range in .001 in.	.200	.100	.020
Smallest fractional range (in.)	Thirty-seconds	Thirty-seconds	Sixty-fourths
Low limit of fractional range (in.)	$\frac{5}{16}$	$\frac{7}{32}$	$\frac{1}{64}$
Smallest block (in.)	.100	.050	.010

NOTE: Low limits are points above which all dimensions within set range are consistently obtainable in the increments shown.



SCRAP PREVENTION: Direct use of gage blocks gives exact dimensions, eliminates need for inter-

mediate gages such as go, no-go snap types. This reduces the risk of measurement-transfer errors.



VERSATILE TEAM: The two gear honing units handle a wide variety of gears in small lots with fast cycle.

Honing Setup Processes Gears In Fast Adaptable Cycle

By John H. Jones—Factory Manager, Toledo Div., Dana Corp., Toledo

Fast honing cycle eliminates the need for costly detection and cleanup of nicks and burrs.

Two honing units shift easily for wide range of gear sizes.

■ In small-lot and medium production, hardened gears pose the problem of effective removal of nicks and burrs. Where quantities range from 300 to 600 gears per lot, some nicks and burrs are bound to occur on the edges and tips of gear teeth and in tooth flank portions.

Such conditions interfere with proper tooth-to-tooth operations during meshing. To solve this prob-

lem, Dana Corp.'s Toledo Div. went to gear honing.

Previously, inspectors located nicks and burrs by sound testing on conventional gear speeders. Removal was done manually with a pencil grinder.

Since this method of detection and removal did not adequately remove all the nick interference, it was not unusual to have to tear down a transmission for reworking. The new method eliminates the need for inefficient detection and cleanup.

Hone Follows Hardening—The setup includes two Red Ring gear

tooth honing machines made by the National Broach & Machine Co., Detroit. All production gears pass through these machines after hardening.

Through semi-automatic loading devices, one operator can load a gear with minimum skill on a locator in mesh with the honing tool. The tool is an abrasive-impregnated gear-like piece.

As the operator pushes a button, the gear is automatically positioned on centers, and the coolant doors shut. After a fast honing cycle, the doors open. When the centers retract, the operator removes the

gear from the locator and inserts another.

Use Constant Pressure — The honing units make use of the constant-pressure honing method. An air cylinder tilts the gear into controlled tight-mesh contact with the honing tool.

The cylinder maintains a constant pressure between the work gear and honing tool. At end of the cycle, the air cylinder tilts the work table down for removal of gear.

The two machines handle a wide variety of 6-, 7-, and 8-pitch spur and helical gears, ranging from 4 to 11 in. OD. Each unit provides crown honing in which the work is rocked during the honing cycle.

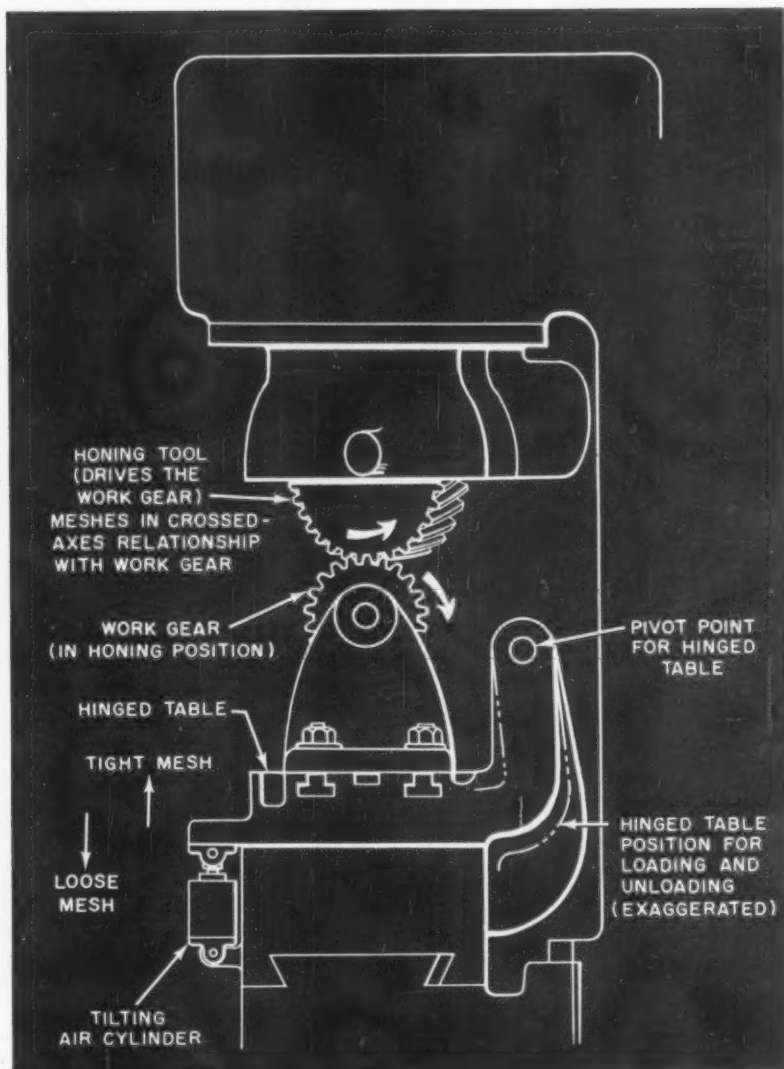
Crowning Action — With the crowning feature, the honing tool can follow the crown on gears that have been crown-shaved before hardening. For uncrowned gears, the unit provides a slight crowning to catch the edge of these gears and make certain that all nicks and burrs are removed at this point.

By selecting honing tools to suit each pitch and pressure angle combination, the unit accommodates the large number of gears. It takes about half the time to change from gear to gear that it takes to change over a conventional rotary gear shaving machine.

Face Width Sets Cycle—Honing time required for the different gears is a function of face width. Gears ranging in widths from 1 to 1½ in. are honed in a ¾ minute cycle. Gears from 1½ to 2 in. width are honed for 1 minute.

Honing tools are a throw-away type that are discarded at the end of their useful life. A typical example is a tool with a 1½-in. face width. Its life is about 3500 eight-pitch gears, 2500 seven-pitch gears and 2000 six-pitch gears.

While the process demonstrates its ability to effectively and economically remove nicks and burrs, several other benefits have been noted. These include improved surface finish, as well as minor corrections in form and runout.



KEY IN HINGE: In automatic honing cycle, air cylinder positions hinged table to control pressure of work gear against driving tool. At the end of the cycle, air cylinder tilts the work table down for removal of gear.



TWO GEARS—ONE TOOL: These two 7-pitch, 17½° pressure angle gears were honed with the same tool. One gear has 28 teeth, the other 46

Design Limits Control Costs In Forming Steel Tubing

There's little limit to what you can do with welded steel tubing.

But where cost is the main factor, there are practical bounds.

Welded steel tubing has proved its worth in countless parts and products in almost every branch of industry. But how well it can be made to perform depends a lot on what the designer knows about how it's processed in the shop.

Forming work is particularly affected by design. While welded steel tubing offers wide latitude, there are limits beyond which difficulty soars and cost is likely to be prohibitive.

Here, according to the Product Development Committees, Formed Steel Tube Institute, are the practical bounds of the more popular methods of forming.

Swaging—Swaging is a process used to reduce, and at the same

time taper, the cross-section of steel tubing. The amount of reduction which can be safely specified depends on the length of the swaged section, outside diameter of the tube, and wall thickness.

There are no hard and fast rules covering the increase in wall thickness during swaging. Generally, the wall builds up in proportion to the reduction in outside diameter. Swaging over a mandrel controls the inside diameter.

Inasmuch as the tube wall is moved from one shape to another, no weight or material loss is caused by the displacement.

If internal finish is critical in tubing on which mandrel swaging is specified, make this known in the specs; inside finish is affected by the finish of the mandrel and the cleanliness of the tube's inner surface.

Keep It Gradual—Since it's very difficult and costly to make abrupt tapers, the taper on each side

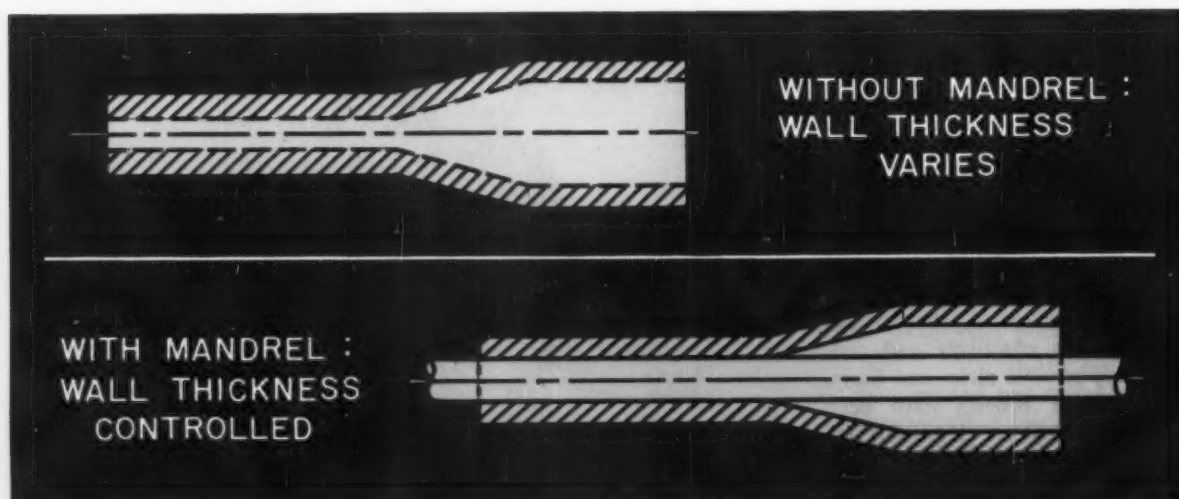
should be limited to about $4\frac{1}{2}^\circ$ or the total included angle made 9° or less.

If a taper of more than 8 in. is specified, two operations are necessary and two sets of dies must be made. This calls for very accurate and expensive dies that must be maintained to within close limits, so the taper will be in line and properly matched. If at all possible, this should be avoided.

Swaging can be performed with many types of stainless steel tube in the 300 and 400 series and on low alloy steel tubing in the 4130 group. Titanium, Inconel and many other alloys also are successfully swaged. Heat treated low alloy welded tubing with tensile strengths up to 100,000 psi may be reduced to about 15 pct by swaging.

Expanding—Use Table 1 to determine limitations when specifying expanded tube. The table is based on use of flash-in tubing types, flash controlled to 0.010

Two Ways to Taper Tubes



maximum, or flash controlled to 0.005 maximum in grades 1010 to 1015. It assumes that the steel has an elongation of 12½ pct.

Beading—Beading finds wide use in making parts for chemical equipment, aircraft engines and consumer products. This type of fabrication has a distinct advantage in that it eliminates the need for welding, brazing, or soldering shoulders on a tube.

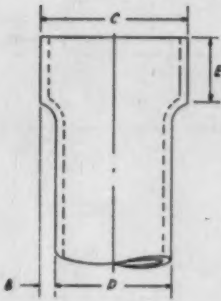
A general rule-of-thumb dictates that beading sizes should be limited to between 30 and 35 pct of base tube OD, depending on wall thickness. When these limits are exceeded, expensive tooling will be required.

Standard diameter tolerances for expanded or depressed beads are ± 0.010 in. Table 2 can be used to determine extent of bead.

Flanging and Flaring—A flange is an external or internal rib or rim, either for strength, for guiding or for attachment to another object.

A regular flange is one in which the rim is formed at 90°. Flared tubing ordinarily used with standard fittings for joining is formed at an angle less than 90°.

Van stone flanging provides great flexibility in fluid lines, by permit-

Table 1 | Limits for Expanded Tube				
				
D	B	C	E	
½	⅛	⅜	¼ to ½	
1	⅜	1 ⅜	¼ to 1	
1½	⅝	1 ⅞	¼ to 1½	
2	¾	2 ¼	¼ to 2	
2½	⅞	2 ⅞	½ to 2½	
3	⅞	3 ⅞	½ to 2½	
3½	⅞	3 ⅞	½ to 2½	
4	¾	4 ½	½ to 2½	

Use this formula for in-between sizes:

$$B = \frac{D \times 0.125}{2} = D \times 0.0625$$

Where D is diameter of tube, and B is width of flange on one side.

Note: All dimensions are in inches.

ting easy removal of tube sections for replacement, inspection or additions. This method also permits the use of light-wall tube or pipelines, thereby providing economy of material and easy handling.

Cold van stone flanging provides

sharp corners, if the wall of the tube being flanged isn't too heavy. Wall thickness of 16 to 13 gage will produce the sharpest corners. In the case of 12 and heavier gage, there's enough metal to permit

Upsetting Is a Versatile Method

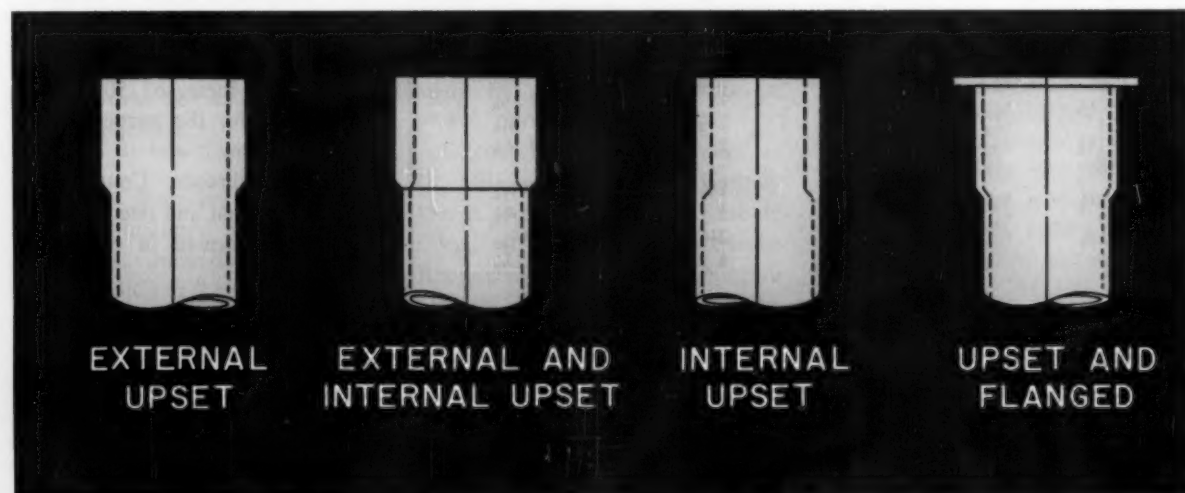
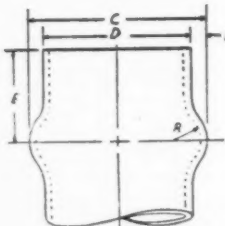
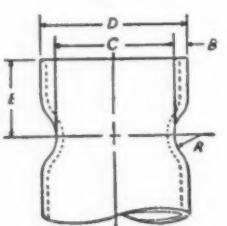


Table 2 | Tolerances for Two Types of Beads

Expanded Bead					Depressed Bead				
									
D	B	C	Min. R	E	D	B	C	Min. R	E
1/2	1/8	9/16	1/8	1/4 to 1/2	1/2	1/8	7/16	1/8	1/4 to 1/2
1	1/16	1 1/8	1/8	1/2 to 1	1	1/16	3/4	1/8	1/2 to 1
1 1/2	3/32	1 11/16	3/16	1/2 to 1	1 1/2	3/32	1 5/16	3/16	1/2 to 1
2	1/8	2 1/4	3/16	3/4 to 1 1/2	2	1/8	1 3/4	3/16	3/4 to 1 1/2
2 1/2	5/32	2 13/16	1/4	1 to 2	2 1/2	5/32	2 3/16	1/4	1 to 2
3	3/16	3 3/8	1/4	1 1/2 to 2 1/2	3	3/16	2 5/8	1/4	1 1/2 to 2 1/2
3 1/2	7/32	3 15/16	1/4	1 1/2 to 3	3 1/2	7/32	3 1/16	1/4	1 1/2 to 3
4	1/4	4 1/2	1/4	1 1/2 to 3	4	1/4	3 1/2	1/4	1 1/2 to 3

Use this formula for in-between sizes:

$$B = D \times \frac{0.125}{2} = D \times 0.0625$$

Where B is width of flange, bevel or bead on one side, and D is outside diameter of tube.

Note: All dimensions are in inches.

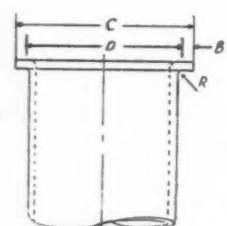
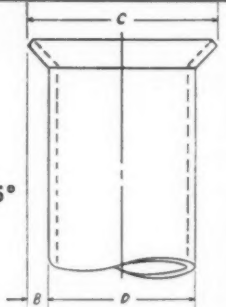
sharpening the corners by taking a light cut off the face.

Table 3 is based again on use of flash-in tubing types, flash controlled 0.010 maximum or flash controlled to 0.005 maximum on grades 1010 to 1015.

Spinning—Tube spinning offers excellent examples of how process control can produce a variety of wall forms. This technique has only recently achieved real success. It can be applied to most metals. As with drawing or swaging, the spinning process gives a good grain flow structure.

Spinning closes the ends of tubing and increases the wall thickness at these points to receive end fittings. Thickness of the spun end may be made considerably heavier than the wall thickness of the tube if desired. Tubes of almost any length may be spun closed on either one or both ends. Due to the hardening properties of stainless, spinning is mostly used for small production items.

Table 3 | How to Design Flanges

Flanging 90°			Flanging 45°		
					
Radius R should be greater than wall thickness			D	B	C
1/2	1/32	9/16	1/2	1/8	9/16
1	1/16	1 1/8	1	1/16	1 1/8
1 1/2	3/32	1 11/16	1 1/2	3/32	1 11/16
2	1/8	2 1/4	2	1/8	2 1/4
2 1/2	5/32	2 13/16	2 1/2	5/32	2 13/16
3	3/16	3 3/8	3	3/16	3 3/8
3 1/2	7/32	3 15/16	3 1/2	7/32	3 15/16
4	1/4	4 1/2	4	1/4	4 1/2

Use this formula for in-between sizes:

$$B = D \times \frac{0.125}{2} = D \times 0.0625$$

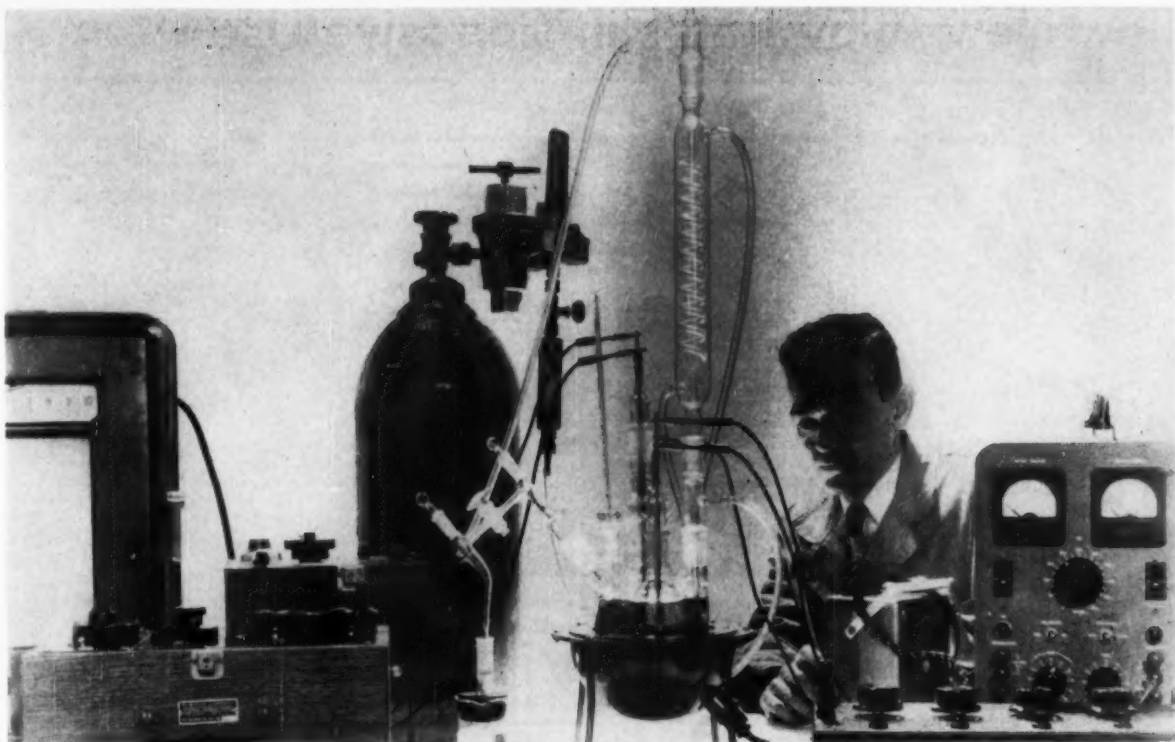
Where B is width of flange, bevel or bead on one side, and D is outside diameter of tube.

Note: All dimensions are in inches.

Upsetting—Welded steel tubing can be upset while hot by the usual methods employed for this kind of operation. Requirements vary by size and gage and the number of operations possible in the upsetting machine. It's possible, by using enough operations, to completely close the end of a 1 1/4 in. tube for a distance of about 3 in. by upsetting and swaging.

Ordinary upsets, in which wall thickness is increased 50 pct, are often done for the purpose of increasing strength and to allow for cutting of threads. Combinations of both external and internal upsets may be performed in one length of tubing.

Reprints of this article are available as long as the supply lasts. You may obtain a copy from Reader Service Dept., The IRON AGE, Chestnut & 56th Sts., Philadelphia 39, Pa.



PROVES THEORY: Electrochemical test proves that noble metal additions function in accordance with theory.

Titanium Alloy Gets Protection From Noble Metal Additions

Adding palladium to titanium creates a new alloy that can withstand both reducing and oxidizing acids.

It's a case where a proposed theory works out as expected in actual practice.

■ A new discovery will greatly broaden titanium's application in the process industries. The addition of as little as 0.1 pct palladium to titanium makes an alloy which is resistant to boiling solutions of reducing acids. And there's no impairment of titanium's inherent resistance to oxidizing acids.

Equipment designed and fabri-

cated with the new alloy can be used for both kinds of acids, thus boosting flexibility and prolonging useful life. Where process conditions unexpectedly change from reducing to oxidizing, the new alloy might be an important factor in preventing equipment failure.

Discoverer of the new alloy is Dr. Milton Stern of Union Carbide Metals Co., Div. of Union Carbide Corp., at the company's Metals Research Laboratories, Niagara Falls, N. Y.

Check Corrosion Rate—Titanium is well-known for its ability to resist corrosion in extreme oxidizing environments, such as boiling nitric acid or ferric chloride. It was

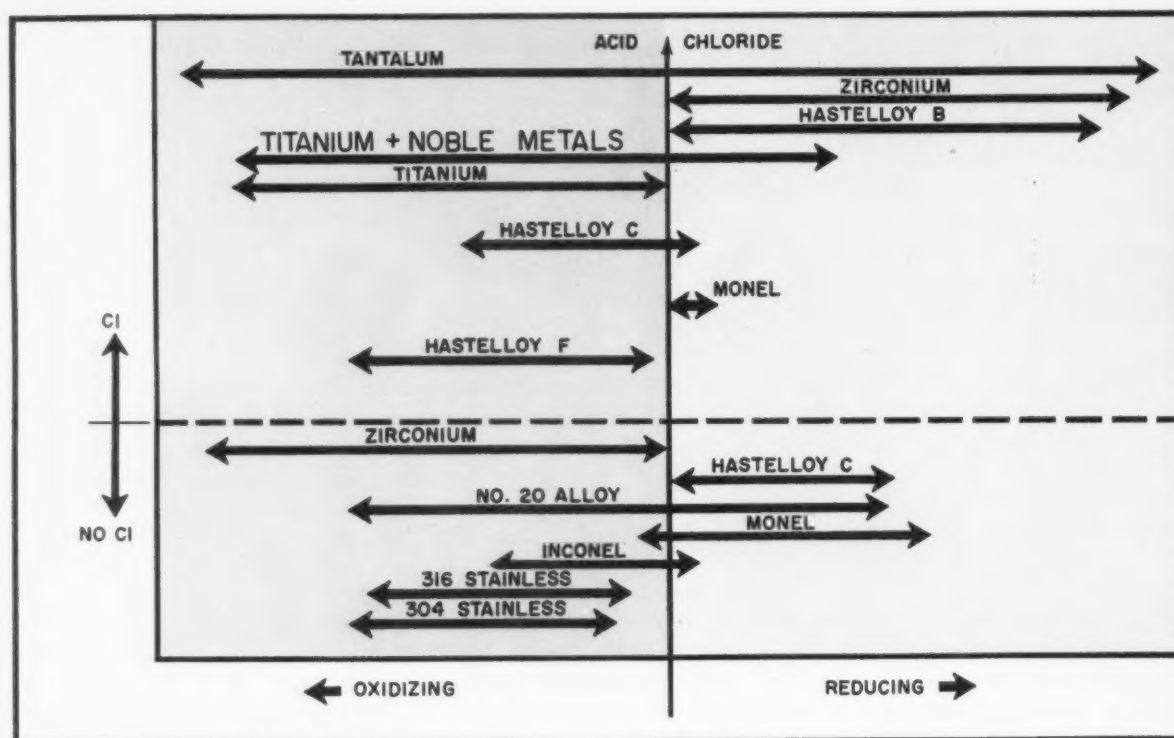
already being fabricated into pumps, valves, and other chemical industry equipment.

However, in a reducing environment, such as hydrochloric or sulfuric acid, titanium was not always serviceable. For example, in a boiling 5-pct solution of hydrochloric acid, titanium dissolves at the rate of more than 1 in. per year.

The new alloy now overcomes this obstacle. By adding 0.1 pct palladium, a noble metal of the platinum group, the rate of corrosive attack drops to less than 0.01 in. per year, a usually acceptable level.

Choice in Noble Metals—In a long series of tests, Dr. Stern determined that small additions of most

How New Alloy Rates in Corrosive Use



COMPARE MATERIALS: Total area represents a variety of corrosive environments. Moving from

vertical line left or right means a more aggressive environment. Lines show upper limit of each alloy.

other noble metals would also improve titanium's performance as a corrosion resistant metal. These include platinum, rhenium, ruthenium, iridium, osmium, rhodium and gold.

Tests of mechanical properties of the new alloy show that they're identical to the properties of unalloyed titanium. In fact, adding as much as 0.2-pct palladium has no effect on strength or ductility of titanium. The new alloy can also be cold- and hot-worked without difficulty.

In developing the new alloy, Dr. Stern advanced an electro-chemical theory for the role of noble metal additions on corrosion passivity. A noble metal is essentially insoluble in corrosive environments and has a high exchange current for hydrogen ion reduction.

Striking Ratio—When added to a metal such as titanium, a noble metal appears at the surface of the

alloy to create a bi-electrode or galvanic couple. It thus serves as a site with a low hydrogen overvoltage, resulting in passivity and a marked decrease in corrosion rate.

It's all the more striking when it's realized that all that's needed is one atom of palladium for every 2000 atoms in the alloy.

In a previous work, Dr. Stern had proposed that passivating-type inhibitors function by creating a mixed potential more noble than the critical potential for passivity of the metal involved. It's a basic concept that applies not only to inhibitors but also to the phenomenon of anodic protection.

Theory Becomes Practice —

Titanium exhibits unusually active values of critical anodic potential. Often, this potential is even more active than the reversible hydrogen potential of the solution. Thus the theory postulates the establishment of passivity by alloying with ele-

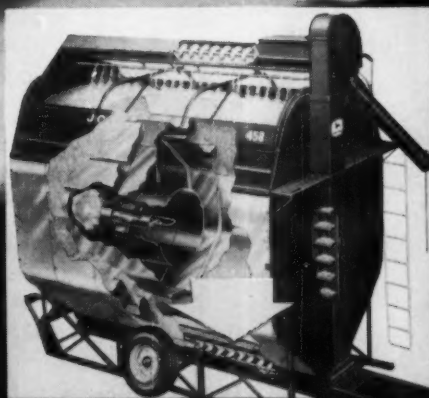
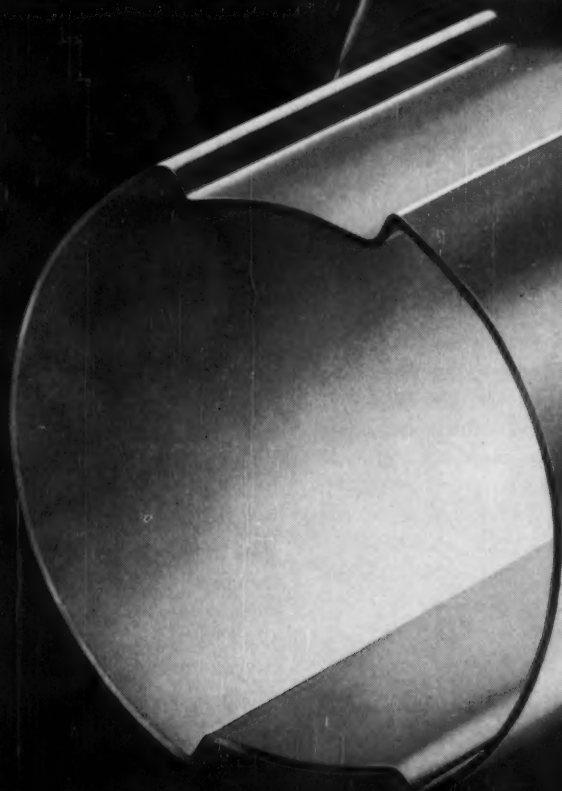
ments having low overvoltage characteristics.

The economics of noble metal additions may be misleading at first glance because of the high prices involved. At mid-March prices, 0.1-pct palladium, which was quoted at \$19 per troy ounce, would add about 28¢ per lb to the price of titanium mill products.

But this figure should be thought of in terms of prices for bars, plates, sheets and wire of titanium ranging from about \$4 to \$14 per lb. The benefits in solving corrosion problems are expected to outweigh the increased cost of the alloy.

Lincense Production—Patent applications covering this development have been filed. Present plans of the company are to offer licenses to produce the alloy. Titanium mill products producers will in turn sell the new alloy to fabricators of processing equipment.

AGAIN-



Revere helped "fit the metal to the job"

... AIDING JOHN DEERE IN DESIGNING ITS FIRST GRAIN DRYER

The greatest bugaboo the farmer has to contend with in harvesting grain is the weather. If it is bad and the grain passes its peak of yield he loses time and money. The new JOHN DEERE 458 Grain Dryer makes it possible for the farmer to harvest when his grain reaches peak yield.

The Dryer was designed from the ground up to be superior in every respect yet competitive in price. In order to assure even feeding of the grain from the start, two metering rolls at the base of the machine are used (Cutaway above shows position of rolls in machine while large illustration is section of the Revere Welded Steel Tubing used for the 44 $\frac{1}{4}$ " long rolls).

In designing this Dryer JOHN DEERE Engineers considered various kinds of materials, finally specifying Revere Welded Steel Tubing, cold rolled 4 $\frac{1}{2}$ " OD x .065" wall, in the special grooved shape you see above, as being the best material available. Although difficult to fabricate, by most mills, Revere encountered no problems because of its vast experience in producing welded steel tubing in various shapes, sizes and gauges... from $\frac{1}{4}$ " to 5" OD round, with walls from .028" to .250" depending on the size.

In fact it was the availability of the tube, plus the experience of making it in large sizes that decided DEERE Engineers to specify Revere. Performance of the tube, JOHN DEERE tells us, has been highly satisfactory.

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PATENT REVIEW

New Patents In Metalworking

Continuous Casting

Method and apparatus for casting, J. B. Brennan (by Helen E. Brennan, executrix), Mar. 24, 1959. Improved method continuously casts metal wires or rods. A grooved mold or core moves downwardly through or against a pool of molten metal. Gas isn't entrapped, as in pouring molten metal. No. 2,878,537.

Chill Pad

Chill pad for ingot mold, E. E. Theis, Mar. 24, 1959. A novel chill pad for a steel ingot mold comprises a coiled steel strip welded on one side to a plate. The device is placed, coil side up, in the bottom of the ingot before pouring. The coil chills steel while the plate prevents the coil from rising into the ingot. No. 2,878,538.

Coil Handling

Apparatus for handling coiled rod bundles, M. P. Sieger (assigned to United Engineering & Foundry Co., Pittsburgh, Pa.), Mar. 24, 1959. An apparatus effectively removes and transfers coiled rod bundles and the like from a coiling station in a rod or bar mill. No. 2,878,582.

Rolling Transfer

Rolling mill transfer, E. T. Peterson (assigned to Birdsboro Steel Foundry & Machine Co., a corporation of Del.), Mar. 24, 1959. A method transfers a work bar from one roll stand to another without

intermediate rotation of the bar and with minimum length of travel. Wear on the transfer table rollers at the guards is minimized. No. 2,878,918.

Oxygen Blast

System for supplying oxygen to blast furnace tuyeres, E. R. Wagner (assigned to U. S. Steel Corp., a corporation of N. J.), Mar. 24, 1959. A system adds oxygen or an oxygen-enriched blast in an amount which is varied inversely with the rate of air flow through each tuyere. Thus the total supply of oxygen is maintained substantially constant. No. 2,879,056.

Cold Working

Method of cold working metals in the presence of a water-insoluble polysulfide, F. Singer, Mar. 3, 1959. A metal article is cold worked while in contact with a polysulfide, whereby a protective coating of metal sulfide forms on the surface within the zone of deformation. No. 2,876,149.

Flux Wash

Flux, D. B. Speed and I. R. Smith (assigned to E. I. du Pont de Nemours & Co., Wilmington, Del.), Mar. 24, 1959. A galvanizing flux wash composition comprises zinc ammonium chloride and an alkyl sulfonate. No. 2,879,195.

Aging Alloys

Method of aging iron-base austenitic alloys, T. W. Eichelberger

(assigned to Westinghouse Electric Co., East Pittsburgh, Pa.) Mar. 24, 1959. A multiple-stage heat treatment procedure ages high-temperature austenitic alloys. Alloys contain a precipitation-hardening component, e.g., titanium. The alloy is first heated for 2 to 50 hrs at 1100 to 1250°F, then slowly raised to 1300 to 1450°F. It's held there to attain optimum creep-rupture properties. No. 2,879,194.

Melt Additions

Methods for the treatment of a melt with briquetted substances, F. J. O. Hurum, Mar. 24, 1959. To accelerate treatment of a metallurgical melt (as in refining iron), scale, limestone, fluorspar and added iron ore are formed into

"Patent Review" appears in the third issue of The IRON AGE each month. Look for it in the May 21 issue.

briquettes having a hole therein. Briquettes, skewered and clamped onto a rod, are pushed into the melt. An effective and rapid reaction between melt and briquettes results. No. 2,879,156.

Ore Smelting

Smelting finely divided iron ore, W. E. Greenawalt, Mar. 3, 1959. Ore showers through a heated vertical shaft making a mixture of reduced and unreduced ore. Unreduced ore is separated and heated with a carbonaceous material to complete the reduction. There's no need for pelletizing or sintering. Also it can use a relatively low-cost fuel. No. 2,876,092-3.

Reducing Ores

Method of reducing iron oxide, T. F. Reed (assigned to United States Steel Corp., a corporation of N. J.), Mar. 3, 1959. Process reduces high purity iron oxide ores in fluidized beds at high temperatures. The high-purity ore mixes with siliceous ore fines. Result is a mixed ore of the proper composition. No. 2,876,091.

Copies of U. S. Patents are available at a cost of 25¢ each from Commissioner of Patents, Washington 25, D. C.



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FREE LITERATURE

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Gas Analysis

Orsat gas analyzers are reviewed in a 12-page brochure. It points out that the Orsat method of measuring gases has been accepted as the standard of accuracy in industrial and scientific work since 1874. (The Hays Corp.)

For free copy circle No. 1 on postcard, p. 137

Bridge Cranes

Underhung, single bridge, motor-driven cranes are described in an 8-page bulletin. Crane capacities range from 1 to 10 tons, spans to 50 ft, speeds of 75, 125, 175 fpm. (Wright Hoist Div., American Chain & Cable Co., Inc.)

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Air, Fume Control

Two recently issued bulletins show how flexible hose can be used to advantage in air handling and fume control. (The Flexaust Co.)

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Tool Manual

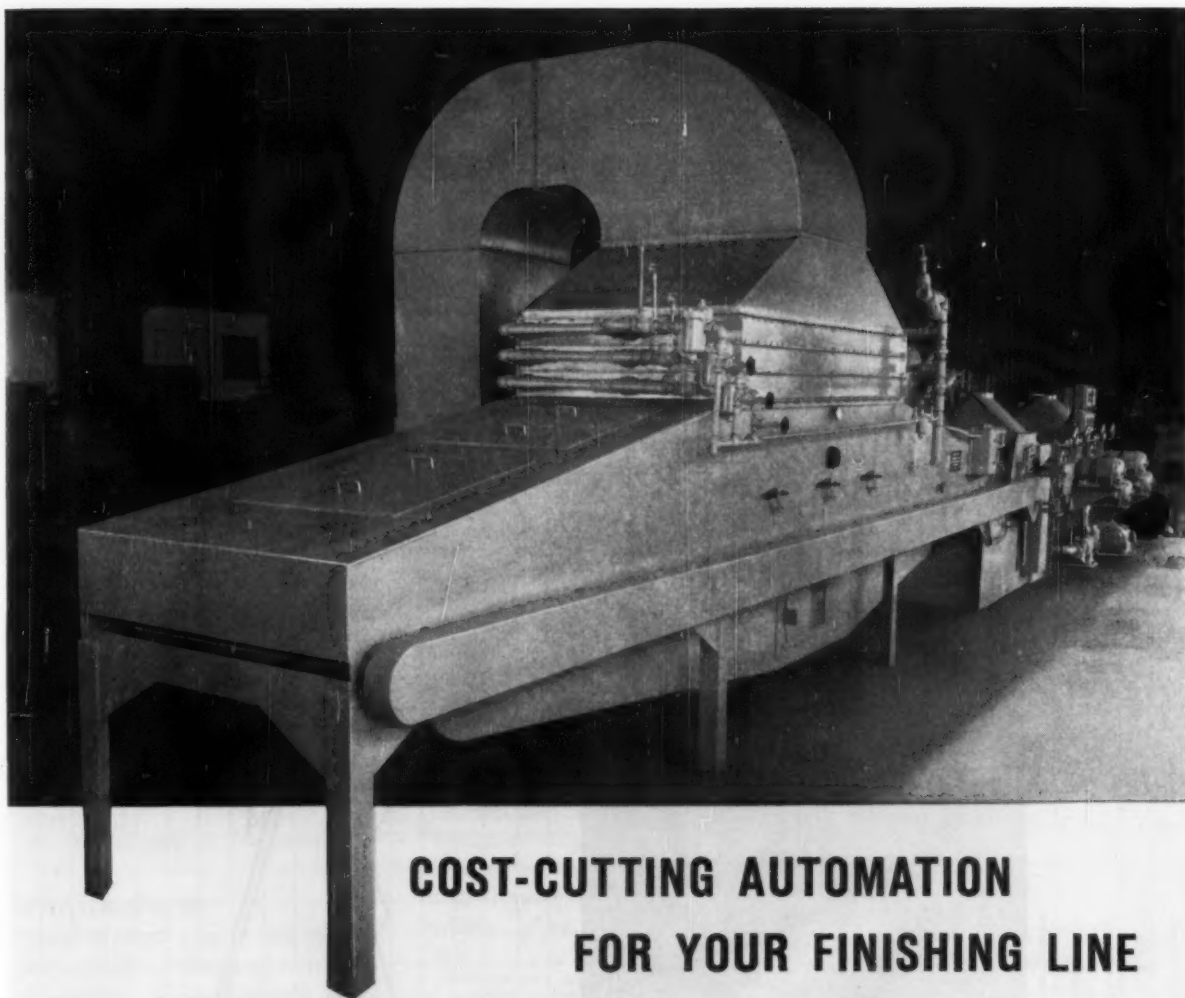
A 64-page tool manual can help machine operators, tool layout and tool maintenance men in selecting, using and servicing cemented carbide cutting tools. (Kennametal Inc.)

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Vibrating Screens

Dust-tight enclosures for floor mounted, single, double and triple deck vibrating screens are described in new literature. Specially designed to solve air pollution problems, this heavy-duty enclosure keeps dust contained. There's easy access to screening equipment, however. (Allis-Chalmers Mfg. Co.)

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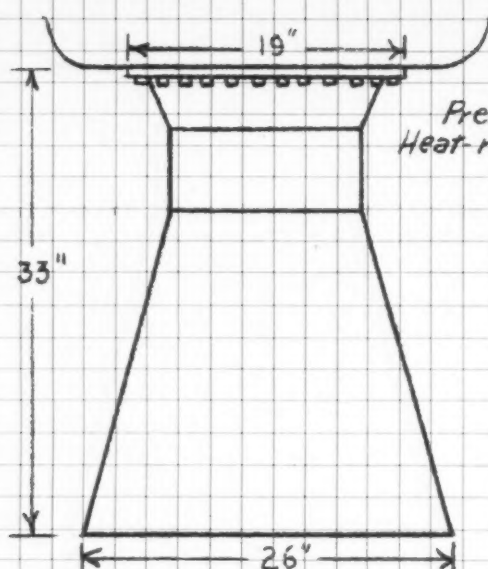
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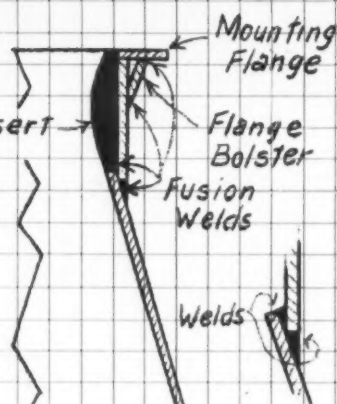
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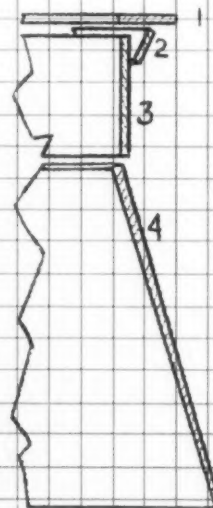




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Three new machines described in a brochure boast accuracy to split tenths. They include: (1) a precision jig borer, (2) a precision jig grinder and (3) a universal measuring machine. (Moore Special Tool Co., Inc.)

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Gearmotors

Helical gear-motors are described in a 16-page bulletin. (General Electric Co.)

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Architecture

Stainless steel uses in the architectural field are discussed in a 50-page booklet. It shows curtain wall design and applications on specific buildings. (Allegheny Ludlum Steel Corp.)

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Data Automation

Colorful in appearance and easy to understand, a 10-page brochure gives basics of a newly-announced data processing system. Described as "a new concept" in practical office automation, it's explained in non-technical terms. The system adapts to user companies of all sizes. (Royal McBee Corp.)

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Lighted Switches

Lighted indicator and pushbutton switch devices are featured in a 20-page catalog. For modern, efficient control panels, the new devices offer great versatility in combined indication and control. Parts simply

snap together to form combination switch-indicator devices. (Micro Switch Div., Minneapolis-Honeywell Regulator Co.)

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Materials Handling

Features of a new dual-range, fully power-shifted automatic transmission are outlined in a 4-page bulletin. It's optional equipment on recently announced, pneumatic tire lift trucks in the 6000- to 8000-lb capacity range. (Hyster Co.)

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Boring Bars

An 8-page bulletin reviews more than 114 standard boring bars. Specifications cover two lines of micro-adjustable and two lines of nonadjustable boring bars. All boring bars use standard throw-away carbide inserts. (Wesson Co.)

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Belt Conveyors

Belt conveyors are subjects of an 88-page catalog. Equipment shown includes heavy-duty and standard roller bearing and precision ball bearing idlers. (Continental Gin Co.)

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Roll-up Doors

What's involved in specifying and installing industrial rolling steel doors? Can rolling steel doors help make production operations safer, more flexible? These and other questions are answered in a 16-page publication. (R. C. Mahon Co.)

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Stainless Pipe

Stainless pipe and tube are offered in an 8-page brochure. It describes 0.03 max. carbon stainless pipe and tube called Unionweld. Variations, including drawn tube with ID bead removed, are described. (Union Steel Corp.)

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dusty are offered in a catalog. It presents: engineering services and facilities, fabrication equipment and procedures, and field erection services. Shown are various products like hot metal cars, slag cars, cinder cars, openhearth ladles, special openhearth cars and equipment, electric furnace ladles and accessories. (William B. Pollock Co.)

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Press Welders

New press-type spot and projection welders are covered in a brochure. (Federal Machine and Welder Co.)

For free copy circle No. 17 on postcard

Rail Clamp

Newly-designed, a rail clamp protects bulk materials handling bridges and unloaders in winds of more than 100 mph. A 4-page folder gives details. (Dravo Corp.)

For free copy circle No. 18 on postcard

Grinder, Buffer

A catalog details grinders and buffers. Equipment reviewed includes: pedestal grinders, snagging grinders, disk grinders, lathe grinders, carbide tool grinders, buffing and polishing lathes, dust collectors, abrasive cutoff machines, speed lathes and special machinery components for grinding, polishing, milling, drilling and boring. (Cincinnati Electrical Tool Co.)

For free copy circle No. 19 on postcard

Aluminum Diecastings

Inherent characteristics of aluminum which influence melting and holding are considered in a folder. It emphasizes importance of proper melting equipment and procedures in producing aluminum diecastings. (Apex Smelting Co.)

For free copy circle No. 20 on postcard

Universal Joints

Single and double universal joints are presented in a catalog. It covers: disassembly, reassembly and

lubrication; key seats, setscrews and broaches available; hints for selecting proper joint for any job; applicable military specifications. (Curtis Universal Joint Co., Inc.)

For free copy circle No. 21 on postcard

Fork Trucks

Three literature pieces give information about fork lift trucks. The first, four pages, contains data on 2000 to 10,000-lb capacity. The second is a review of engineering features which provide "years ahead" performance. The third spotlights a recently introduced 2000-lb capacity truck. (Allis-Chalmers Mfg. Co.)

For free copy circle No. 22 on postcard

Galvanometer

A data sheet describes a guarded galvanometer. It reviews use of the self-contained lamp and scale galvanometer with instruments like a potentiometer, wheatstone bridge and others. (Leeds & Northrup Co.)

For free copy circle No. 23 on postcard

Bearing Bushings

Roller bearing bushings are dealt with in a 6-page catalog. It describes advantages and applications of live roller bearing bushings in jigs and fixtures, special machines and automation equipment. Also covered: use of live bushings in horizontal milling machine out-board support applications. (Donley Products, Inc.)

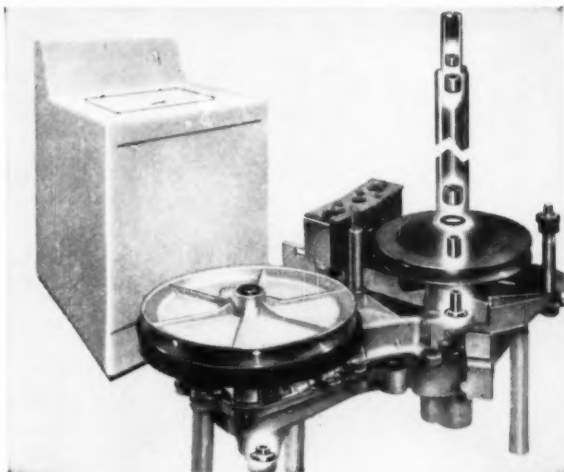
For free copy circle No. 24 on postcard

Plant Location

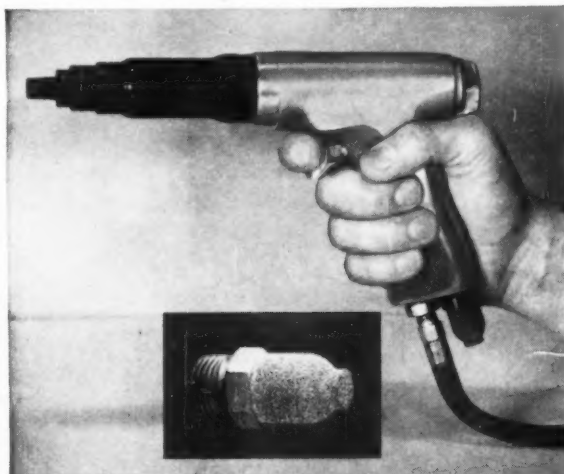
Looking for a new plant site? A really top one? If so, don't overlook the Port of Oakland (Calif.). A brochure now ready acclaims the merits of this area—giving some interesting general data, too. Especially noteworthy is a section on future plans. It shows some of tomorrow's best plant sites. These will improve already more than adequate skilled labor, transportation and market assets. (Oakland Board of Port Commissioners).

For free copy circle No. 25 on postcard

BOOST PRODUCT APPEAL with **OILITE**



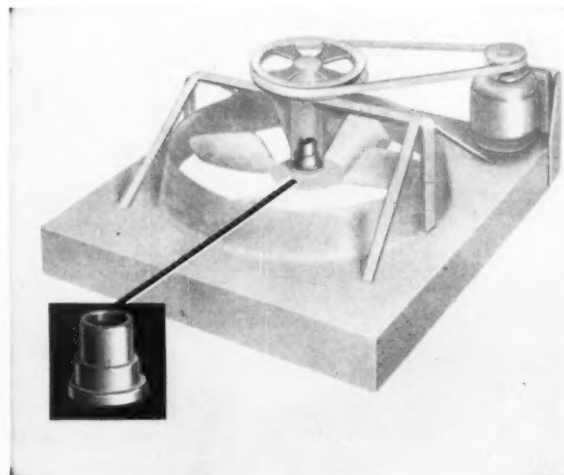
This "best seller" automatic washer is more reliable, more economical with Oilite oil-cushioned bearings.



Oilite filter-diffusers are now boosting the sale of new air tools by making them practically "noiseless".



Dust, grit, shocks — plus payloads up to 34 tons — are all in a day's work for these tough Oilite bearings.



This self-lubricating Oilite bearing refused to fail even after 125 years' service in accelerated life tests.

Quality-built OILITE® bearings, parts and filters help sell many products by improving performance and keeping costs down. Mass-produced at Amplex's 2 modern plants, even the most intricate parts are die-pressed directly into

** Only Chrysler Makes Oilite*

ready-to-use, close tolerance shapes. Amplex engineering, research and production know-how can probably help you. Why not contact your Oilite representative today? Look for him in the Yellow Pages under "bearings—Oilite" or write Dept. R-4.



SINCE 1929



the most trusted name in powder metallurgy!

AMPLEX DIVISION

CHRYSLER CORPORATION, DETROIT 31, MICHIGAN
SELF-LUBRICATING BEARINGS • PRECISION PARTS • METAL FILTERS • FRICTION UNITS

New Materials and Components



Speed Reducers Have Flexible Mounts, Drives

Worm gear speed reducers in a new line boast flexibility of mount and drive arrangements. The high efficiency, high capacity units come in stock in ratios from 5 1/6: 1 to 1212: 1 with center distances from 3 to 21 in. For heavy-duty use, they accommodate any horizontal or vertical drive arrangement. Helical attachments for double and triple reduction units combine efficiency of helical gearing

with high ratio advantage of worm gearing. Improved tooth forms, precision ground alloy steel worms, special high strength bronze gears, and precision ground helical gearing result in space savings. Mount and drive arrangements are flexible because the line features one basic housing design for each size. (Philadelphia Gear Corp.)

For more data circle No. 26 on postcard, p. 137

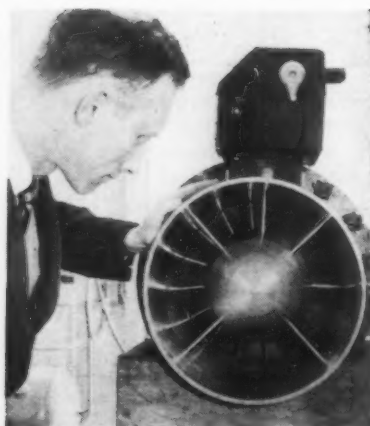


Plastic Sheathing Insulates, Protects Metal Rods

High-strength, paper base laminated plastic sheathing insulates aluminum or steel rods for use under high torque. It solves torque problems common to variable transformers and other equipment which require an insulated shaft that must withstand the mounting of components and operate under high resistance. The sheathing accepts multiple set screw mountings of

components without chipping or cracking. Thus it eliminates potential dangers and equipment maintenance inherent with old style, molded type sheathings. The new sheath solidly anchors to the metal rods. Insulated steel rods are readily available in a wide range of lengths and diameters, in varying insulation thicknesses. (The Richardson Co.)

For more data circle No. 27 on postcard, p. 137



Meter Measures Liquids Via Turbine Principle

Working on the same idea as a powerplant turbine, this meter measures liquids at unusually high rates. It handles up to 15,000 barrels an hour with an accuracy within fifteen parts in ten thousand. This means in six seconds the meter precisely measures as much gasoline as the average automobile consumes in a year. It maintains repeatability within one part in ten thousand. The new meter weighs less than one-eighth that of compar-

able capacity positive displacement meters. Its maintenance of calibration means re-adjustment frequency is substantially reduced. Not only this, the same turbine type meter can handle a variety of liquids in consecutive order without requiring any calibration or adjustment. The meter will measure liquids as light as gasoline or as heavy as viscous motor oil. (Meter & Valve Div., Rockwell Mfg. Co.)

For more data circle No. 28 on postcard, p. 137

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16, 1959



"If you have a rolling problem, call National,"

says John Patton, Assistant Manager—Roll Sales

"... we believe we can contribute to its solution. Our organizational backbone is 'men'—men, trained and experienced in metallurgy and foundry practice who take an individual interest in each problem and its solution ... just as they take an individual interest in the production of each roll that goes through our plant.

"For instance, every steel roll order is individually processed with careful planning and meticulous checking of each detail. Our wide range of furnace sizes permits pouring each order from an individual heat.

"Chilling of each mold is carefully calculated to insure deep penetration for maximum life and high resistance to firecrack and spalling.

"This same care is followed throughout production—through heat-treating, machining, testing, inspecting and shipping.

"So we repeat, 'If you have a rolling problem, call us. Let us help you solve it.'"



GENERAL STEEL CASTINGS CORPORATION

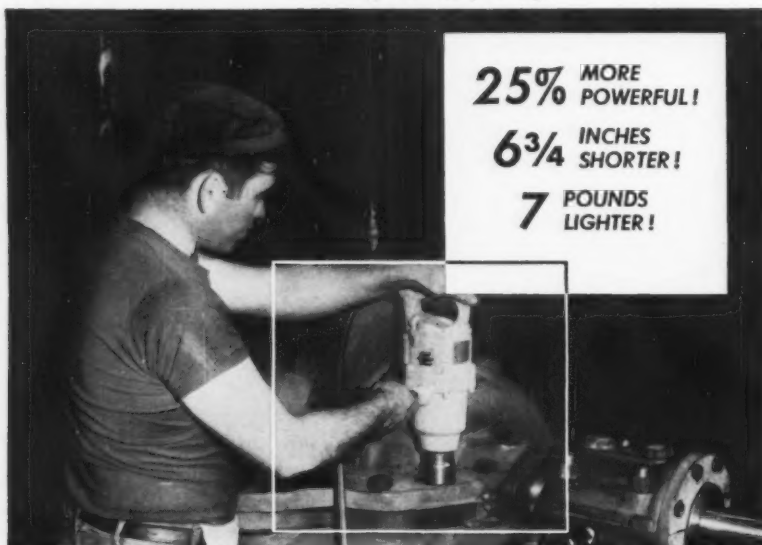
National Roll & Foundry Division

Avonmore (Westmoreland County) Pennsylvania

General Steel Castings Corporation: General Offices, Granite City, Ill.
Plants: Granite City, Ill.—Eddystone, Pa.—Avonmore, Pa.

NEW! SIZE 834 IMPACTOOL

(1/4" capacity)



for faster run-down and easier handling in the tight spots...

Completely new design and construction of I-R's Size 834 Reversible IMPACTOOL gives you the most powerful, yet easiest-to-handle tool for any nut-running job.

New, compact, vane-type motor with direct drive to hammer provides greater torque and five times faster run-down, without transmitting kick or twist to operator. Small size and light weight make the 834 easy to use in tight, awkward positions. Yet rugged construction and strong alloy housing assure long maintenance-free tool life and efficient operation on even the toughest jobs.

Optional equipment includes Spline Drive Anvil, Swivel Inlet Assembly, Inside Trigger Handle, Side Spade Handle, and Extended Anvils.

\$1,250 DIVIDEND DOLLARS

In terms of a Dividend on Payroll Dollars, the new I-R Size 834 can help you earn up to \$1250 per operator, in one year. Ask your I-R representative for details.

WRITE TODAY for Form 5248, describing the I-R 834 in detail. Includes in-use photos, specifications, standard and optional equipment, and accessories. Ingersoll-Rand, 11 Broadway, New York 4, N. Y.

FREE!



Ingersoll-Rand

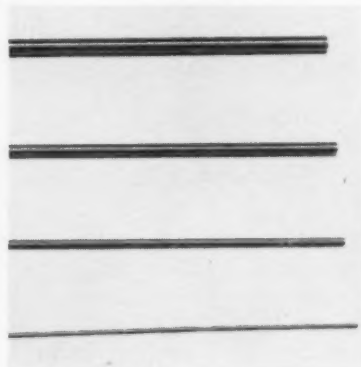
Tools plus AIR engineering
increase output per man

8-919

DESIGN DIGEST

Precision Shafting

Precision ground shafting is now available from stock in Type 303 stainless steel. With a surface finish of 8 microinch or better, the shafting is held to a tolerance of ± 0.0005 on the diameter. It's straight and parallel within 0.0002 per in. of length. Standard shaft



sizes, 1/8, 3/16 and 1/4 in., are ground to fit precision ball bearings. It comes in 1/8 in. increments from 1 to 6-in. maximum length. (PIC Design Corp.)

For more data circle No. 29 on postcard, p. 137

Fiber Rubber

Silicone rubber recently developed is fibrous in nature. It somewhat resembles sponge and foam in properties. The material now comes in a mat of the fibers, oriented in a completely random manner. This gives good tensile and tear strength. The fibrous silicone rubber also has: high permeability, density in the range of 20 lb per cu ft, good compression-deflection characteristics, and a useable temperature range of -65° to 500°F . (Connecticut Hard Rubber Co.)

For more data circle No. 30 on postcard, p. 137

Hose Swivel

This flanged hose swivel is especially for use with fueling hose nozzles, liquid dispensing nozzles and hose lines. It eliminates kinking, twisting and stresses caused by rotary action. Ruggedly built of bronze and aluminum alloys, the

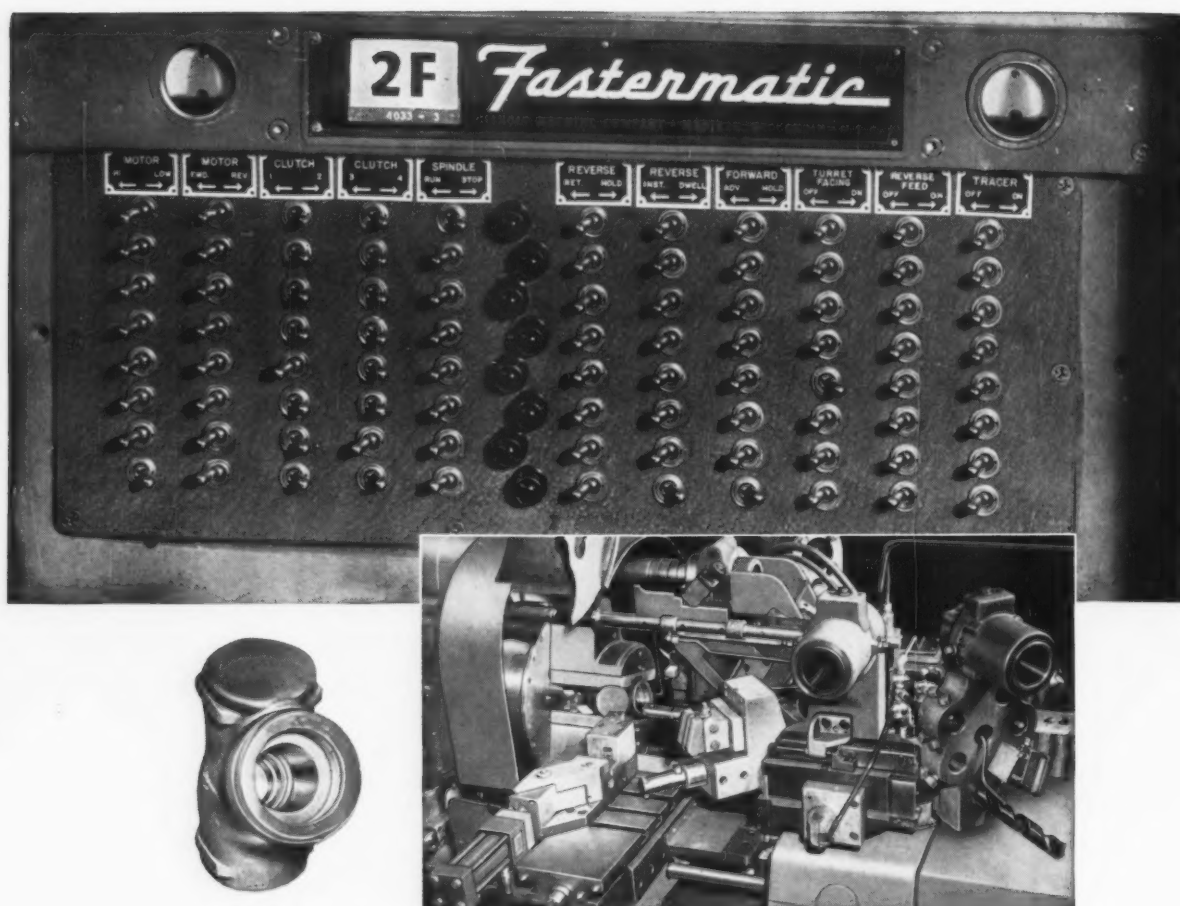


Crucible stainless matches your high standards

Coil after coil of Crucible stainless gleams with unsurpassed lustre because it is precision-rolled on modern mills. Furthermore, Crucible maintains uniform qualities by methodically checking each heat — and ensures precise gauge with electronic measuring controls. For stainless in all gauges down to .010" and in all strip widths, call or write: Crucible Steel Company of America, The Oliver Building, Mellon Square, Pittsburgh 22, Pa.

CRUCIBLE STEEL COMPANY OF AMERICA

CANADIAN DISTRIBUTOR — RAILWAY AND POWER ENGINEERING CORP., LTD.



Edward Valves Div. cuts setup time on valve bodies

Takes advantage of electric setup control panel, octagonal turret, JETracer on Gisholt Fastermatic

You may spot production ideas in the way Edward Valves Division of Rockwell Manufacturing Company, East Chicago, Indiana, is increasing production of 1½" steel Univalve bodies.

A new Gisholt MASTERLINE 2F Fastermatic Automatic Turret Lathe is doing the job. With the Fastermatic's electric setup control panel, the operator pre-selects all important machine functions—including low spindle speeds for forming and threading, and high speeds for other operations. And with the Gisholt JETracer slide tool mounted on an 8-sided turret, a maximum number of surfaces are machined in a single chucking—with greater accuracy, finer finish and with more consistent quality.

Parts are held in an 18" 2-jaw hydraulically operated chuck. Automatic positioning at the end of each cycle speeds loading and unloading. Once the automatic cycle starts, turret tools drill, turn, face, form, relieve, chamfer, bore and thread. Cross slide tools face and chamfer. Critical internal diameters are finished to a high degree of accuracy, using turret-mounted JETracer slide tool.

Like to hear the facts on how the Fastermatic lets you utilize smart tooling...eliminate human errors...get record production on long runs, automatic cycle operating advantages on short runs? Contact your Gisholt Representative. He has the facts, and his wide experience may suggest new methods to improve your profit picture.



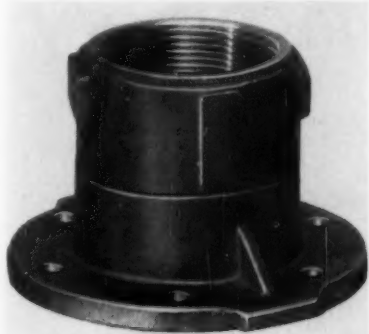
GISHOLT
MACHINE COMPANY
Madison 10, Wisconsin, U.S.A.

WRITE GISHOLT TODAY for advance data on the new Gisholt MASTERLINE Fastermatic Automatic Turret Lathe. Ask for Bulletin No. 1179.

ASK YOUR GISHOLT REPRESENTATIVE ABOUT GISHOLT-FACTORY REBUILT MACHINES WITH NEW MACHINE GUARANTEE

DESIGN DIGEST

nozzle comes in 1½ and 2-in. sizes. Featured is a double ball race construction with a quad ring seal. This provides ease of operation un-

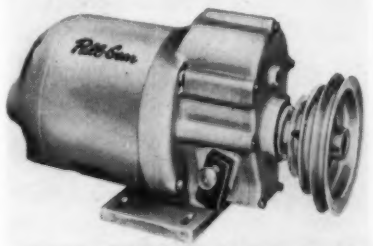


der all conditions. The swivel requires no lubrication and revolves freely and easily, even under line pressure. (Milwaukee Valve Co.)

For more data circle No. 31 on postcard, p. 137

Speed Reducer

Drill presses, lathes, boring mills and similar belt-driven machines can use this speed reducer. It extends machine capacity to handle larger reaming, tapping, boring and other work on normally lighter-duty machines. The finger-tip controlled, quick-change attachment is precision-gearred. It's a single-unit

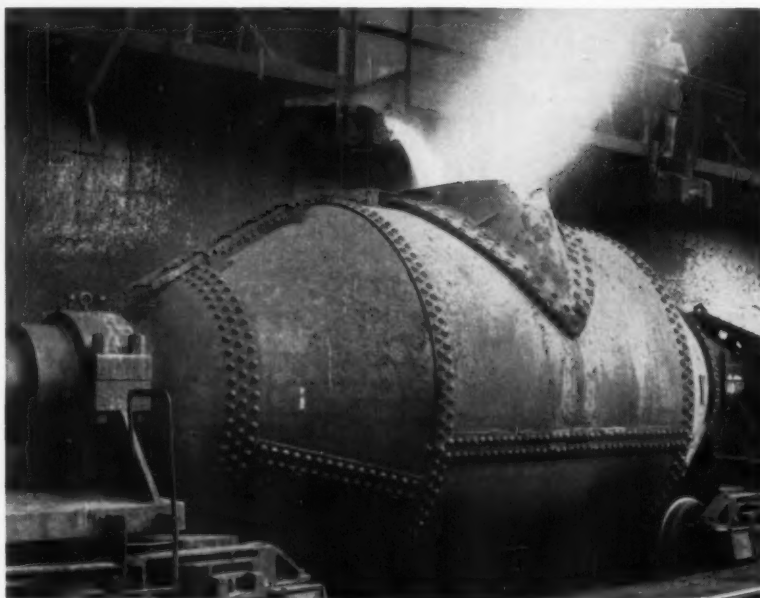


type reducer which provides extra operating torque at reduced machine speeds. This high torque allows use of heavier cutting tools than normally recommended. However, the attachment doesn't overload machines in any way. And it eliminates dangers of stalling or burning the machine motor. The speed reducer comes in a broad range of sizes and ratios to suit most jobs. (The Pull Gear Co.)

For more data circle No. 33 on postcard, p. 137

TORPEDO LADLE LININGS:

a Porter Balanced Lining—gives extra tonnage...lower lining costs...less down time



The Porter Balanced Refractory Lining for hot metal cars is no secret. It simply means putting premium refractory brick into the key sections of a ladle lining . . . *only where it's really needed!*

A major Eastern mill recently made the change: going from an all high-fired, super-duty, clay brick lining to a balanced lining in their 150 Ton "Torpedo" ladles. They put Porter "SHAMVA" Mullite into the "tough spots", such as metal line, spouts and belt section of the "belly".

HERE ARE THE COST-SAVING, HIGH-TONNAGE RESULTS:

Porter "Balanced" Lining	All Super-Duty, High-Fired Clay Lining
Tonnage... 120,000	Tonnage... 72,000

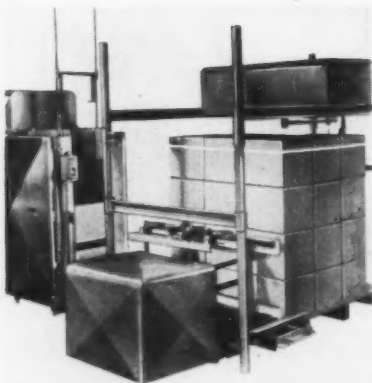
Find out, now, how "SHAMVA" Mullite and "SHAMVA-D" refractories can produce similar results for you. Write *Refractories Division, H. K. Porter Company, Inc., Porter Building, Pittsburgh 19, Pa.*

REFRACTORIES **PORTER** DIVISION

H.K. PORTER COMPANY, INC.

DIVISIONS: Connors Steel, Delta-Star Electric, Disston, Forge & Fittings, Leschen Wire Rope, Mouldings, National Electric, Refractories, Riverside-Alloy Metal, Thermoid, Vulcan-Kidd Steel, H. K. Porter Company (Canada) Ltd.

New Equipment and Machinery

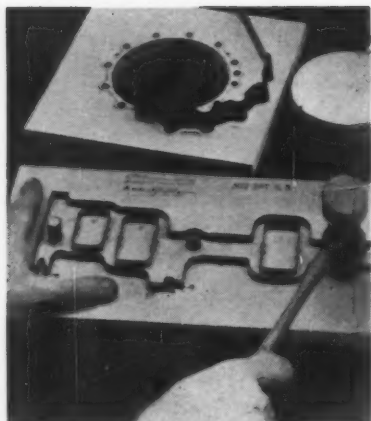


Automatic Handler Economically Loads Pallets

An economical, automatic pallet-loader consists of three synchronized, separately powered units. These are: a stacker, a pusher and a taper. A conveyor connects to existing production lines. The pallet-loader is said to cost less than half the price of other pallet loading machines. Rugged construction with few moving mechanical parts hold maintenance costs down. No electronic or hydraulic devices are

necessary for operation. Labor costs are reduced because no operator is necessary. Since the pallet-loader can be placed on top of the floor it requires no pit. It connects to existing production lines. Thus, installation costs are low. The taper segment of the pallet loader applies a strip of tape to the top layer of items being palletized. (The Lathrop-Paulson Co.)

For more data circle No. 33 on postcard, p. 137

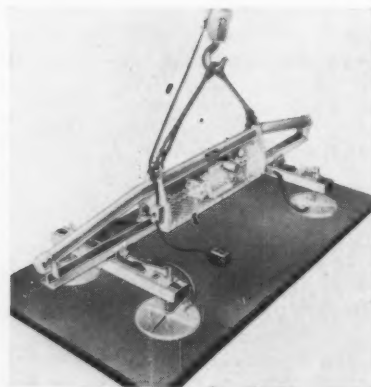


Metal Stamping Dies Cost Less To Produce

Male and female metal stamping dies cost less to produce, thanks to a new method. It involves use of a new stamping material mounted in laminated hardwood with sponge rubber ejection pads. Savings up to 77 pct in cost and up to 90 days in die making have been reported. The larger the die the greater the savings. Reductions are attributed to high quality of the special steel alloy rules. These permit dies that produce stampings in

hundreds of thousands without destruction. Extremely high accuracy is maintained with clean cuts and minimum of burrs. Dies are delivered in a matter of days, usually less than a week. Materials cut cover bronze, brass, copper, aluminum, lead, carbon and stainless steel. Metal ranges are from 1/64 to 1/8 in. (Acme Steel Rule Die Corp.)

For more data circle No. 34 on postcard, p. 137

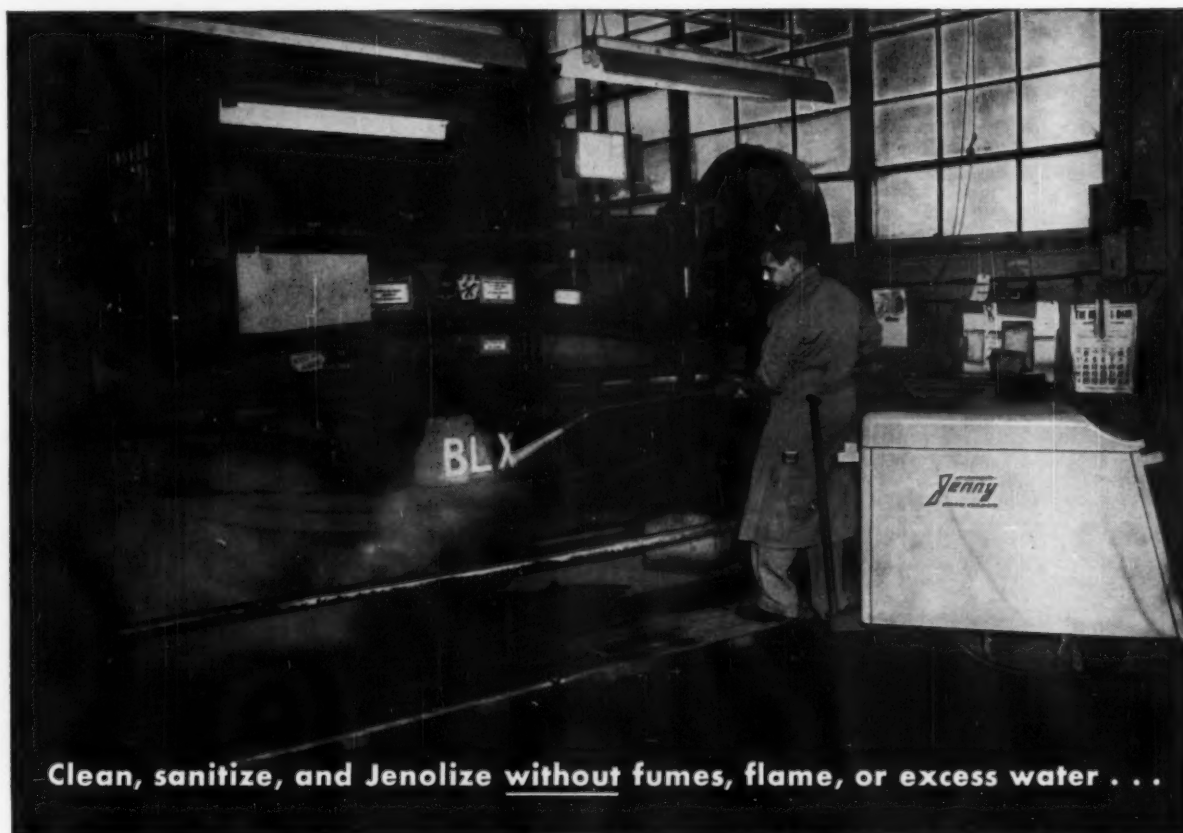


Vacuum Grapple Lets Cranes Handle Plates

Designed for operation with all type cranes is a self-contained vacuum grapple. Available in four standard models, lifting capacities of the grapple range from 500 to 4000 lbs. It consists of a tubular "strong back" which also acts as a vacuum reservoir, and an integral vacuum pump and motor. Rotatable cup arms adjust longitudinally to accommodate various sheet or plate lengths. Each of the two arms carry

two vacuum cups. Cup position adjusts laterally to suit various sheet or plate widths. Interlocked controls provide a safe-to-lift light to indicate adequate vacuum. Instant release is via a push-button operated solenoid valve. This cuts off the vacuum supply and uses a vacuum pump exhaust to "blow" the plate or sheet loose. (Noble Co.)

For more data circle No. 35 on postcard, p. 137



New All-Electric Hypressure Jennyl

Anywhere that flame, fumes, or excess water are objectionable or hazardous, the new Model E-350 All-Electric Jenny® will solve the cleaning or sanitizing problem. And with the new Jenolizing Process, machinery, equipment, and parts are left with a coating that protects against flash rusting, and gives a glossy, like-new appearance to painted surfaces.

Model E-350 combines the right amounts of heat, pressure, and cleaning solution to handle the majority of cleaning jobs at savings of up to 80% in time and labor costs. Its compact size, portability, low water output, and quiet operation without flame, smoke, or fuel fumes, make it ideal for use practically anywhere in the plant.

Send the coupon today for complete information. You'll welcome the outstanding performance of E-350—and the attractive plan which permits you to prove to yourself the economies of this new All-Electric Jenny.



Perfect for

manufacturing plants, food processors, textile mills, chemical and pharmaceutical plants, metal working and fabricating, petroleum industry, canneries, hotels and institutions, and every other operation where fumes, smoke, excess water are objectionable.

Mail Today!

Please send complete information on new E-350 All-Electric Jenny and Jenolizing.

Name Title

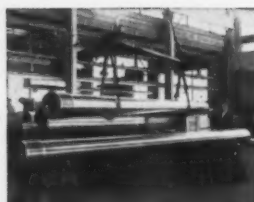
Company

Address

City Zone State



HOMESTEAD VALVE MANUFACTURING COMPANY
Hypressure Jenny Division, P. O. Box 23, Coraopolis, Pa.



Your parts last longer when they're SHENANGO CENTRIFUGAL CASTINGS

Your machine parts, ferrous or non-ferrous, are subject to stress, strain and friction, day after day, year after year . . . so specify Shenango . . . and see what a difference this makes!

Shenango's centrifugal casting process insures longer life because of finer, more uniform, *pressure-dense* grain to begin with . . . free of inclusions, porosity, blowholes and other weakening defects. Then, far less machining is needed and your part is stronger . . . to last and last *and last!*

Shenango's modern and fully-equipped shops will supply you with ferrous or non-ferrous symmetrical parts in virtually any shape or size . . . rough, semi-machined or precision-finished to your most exacting specifications. For full details, write: *Centrifugally Cast Products Division, The Shenango Furnace Company, Dover, Ohio.*

SHENANGO

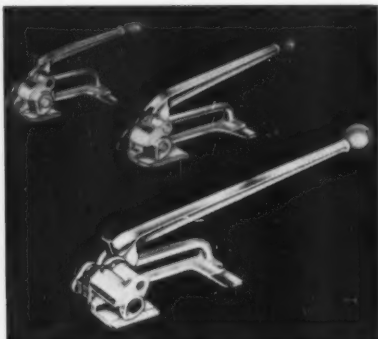
CENTRIFUGAL CASTINGS

COPPER, TIN, LEAD, ZINC BRONZES • ALUMINUM AND MANGANESE BRONZES
MONEL METAL • NI-RESIST • MEEHANITE METAL • ALLOY IRONS

NEW EQUIPMENT

Steel Strapper

Of heavy-duty friction wheel design, this steel strapping hand tool uses cold rolled $1\frac{1}{4}$ x 0.31 and 0.035-in. steel strapping. With ease, it effectively applies tension in strapping large steel coils and sheets. It's designed to meet special requirements of the metal industry. Light in weight, yet it's rugged enough for production strap-

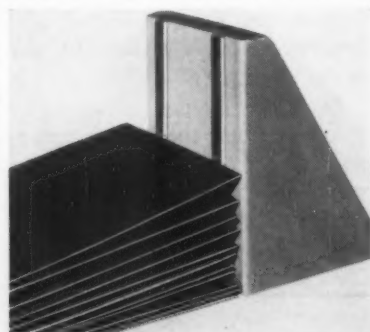


ping of coils and sheet steel. A long handle provides adequate leverage for tensioning heavy-duty strapping. Double pawl action makes it easy to get the desired tension. Sealing can be done either to the front or to the rear of the tool. A companion heavy-duty tightener takes $\frac{3}{4}$ x 0.028 and 0.035-in. cold rolled steel strapping. (Stanley Steel Strapping Div., The Stanley Works.)

For more data circle No. 36 on postcard, p. 137

Sheet Separator

This powerful permanent magnet fanner makes handling of sheet steel both faster and safer. The fan-



ner employs a recently developed ceramic magnet which has a uniform magnetic field and high resis-

tance to demagnetizing influences. When steel sheets are stacked against the fanner, a magnetic field is induced in the sheets. This makes them repel each other and fan out automatically. Handlers may remove single sheets easily and quickly. There's far less danger of injury to hands. Dirty, oily sheets that tend to be "sticky" are no exception. The sheet fanner comes in three sizes to meet all requirements. (Stearns Magnetic Products).

For more data circle No. 37 on postcard, p. 137

Solder Flux

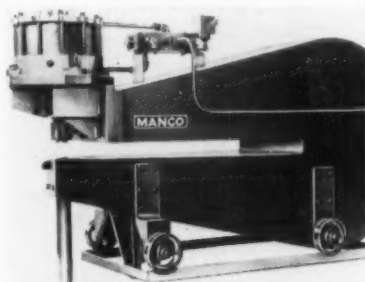
A new flux serves dip soldering of printed circuit boards. It's for electronics jobs requiring zero conductivity as well as non-corrosive properties after soldering. The flux has been approved for military and civilian applications on automatic dip soldering lines. It's mildly acid at soldering temperatures, insuring good joint. Yet it's completely soluble in water both before and

after soldering, eliminating any conductive or corrosive residues. (Fusion Engineering).

For more data circle No. 38 on postcard, p. 137

Sample Punch

How do you determine steel strip quality quickly? One answer is to use this air-operated metallurgical punch. It's not only fast and pre-



cise, but portable and compact. Ruggedly-built, the punch knocks out burr-free 1-in. diam samples from steel strip ranging from 0.006 to 0.019-in. thick. It's even got a removable punch and die for mak-

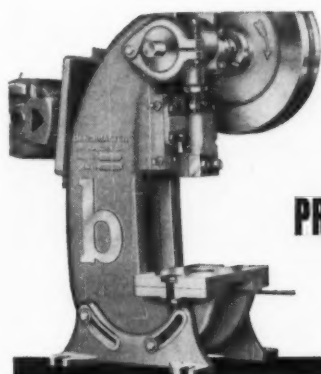
ing different size slugs. The 6-ft high punch rolls into a working position on angle iron track wheels and lets the operator run many sizes of strip through its 40-in. open throat. (Manco Mfg. Co.)

For more data circle No. 39 on postcard, p. 137

Polyethylene Coat

Sprayable and of high-density, new polyethylene coatings apply to metals or glass. The polyethylene liquid dispersions demonstrated excellent continuity (freedom from pinholes). Adhesion is outstanding on a variety of surfaces. In addition, it has high impact resistance, good flexibility on metallic surfaces. It can be applied clear or in a variety of colors. The material applies at room temperature by various conventional coating methods. Coated parts subsequently are heated to 400°F for a few minutes to fuse the coating, bonding it to the surface. (Plastics Div., The Koppers Co., Inc.)

For more data circle No. 40 on postcard, p. 137



THERE'S A BENCHMASTER FOR EVERY PRESS OPERATION

at ratings from
2 to 10 tons!

Benchmaster gives you a series of proven presses and press designs—backed by 20 years of industrial use—with stock parts and dealers from coast to coast!

Benchmasters are the *accepted* presses — standards of the industry for all light tonnage applications.

Made in 2, 5, 8 and 10 ton capacities in Plain OBI, Back-Geared, Deep Throat, Fixed Bed Gap Frame, Multiple Ram and Half Press models with mechanical, air or electric clutches. Also available: Mechanical 2 hand trip lever or 2 hand solenoid operation for maximum safety.

When you need a press for *any* operation, check with Benchmaster... known for service, for reliability... for over-all press versatility, and for low cost!

benchmaster



World's largest
manufacturer of small punch
presses and mills.

1835 W. Rosecrans Avenue • Gardena, California

BEST
FOR
UPSETTING
PIERCING
EXTRUDING
FORGING

PRODUCES MORE AND
BETTER PIECES BETWEEN
DIE CHANGES.



A graphited product for use in working hot metals of all kinds. Good in temperatures up to 2200° F and above. Keeps work cool and extends the life of dies and punches. Highly adhesive, may be applied by brush or swab or diluted with oil for spraying.

Bulletins describing Fiske's 514A Hot Die Lubricant and other specialty lubricants and coolants sent on request.



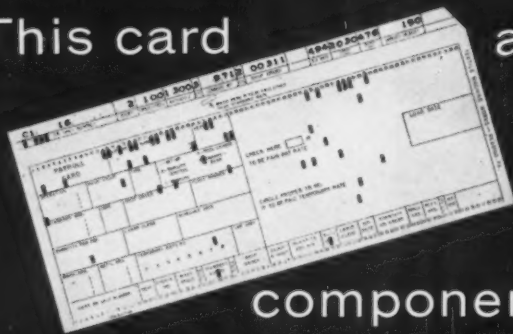
FISKE'S
Since 1870

**METAL WORKING
LUBRICANTS**

FISKE BROTHERS REFINING CO.

1296 LOCKWOOD STREET, NEWARK 5, N. J.
Plants: Newark 5, N. J. and Toledo 5, Ohio

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assures you

on-time delivery
of sub-contract
components and assemblies



It's a small but important part of TMW's electronic punched card scheduling and control system. And it's your assurance that sub-contract jobs, regardless of size or quantity, are delivered *on time*.

You get this when you work with one of the world's largest, most modern and completely integrated manufacturers, whose 65 years' experience in precision (tolerance to 10ths) manufacturing is available to you *now* on either a short or long term basis.

Textile Machine facilities include 1200 modern

machine tools of all types and sizes, a completely mechanized foundry (one of the country's largest), 3000 skilled craftsmen, plus a corps of the industry's top designers and engineers.

Combine these facilities with modern electronic production scheduling controls and quality control techniques . . . and you've got the perfect answer to all your sub-contract problems.

Write today for more detailed information, or for a copy of our latest Facilities File Folder.



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The Iron Age Summary

Critical Time Ahead for Steel

It will be a race against time for users hoping to build stocks against possible steel strike.

Practically all products are sewed up tight until end of June and possible strike deadline.

■ The next two months will be critical ones for steel users hoping to build a safe inventory against the possibility of a steel strike. From here on in it will be a race against time for both mills and their customers.

The mills already are falling behind in their delivery promises for some products. This means that at least a part of June will be used to clean up delivery of tonnages ordered for May shipment.

Market Is Tight—Practically all products are sewed up tight until the end of June, which may be a strike deadline if steel labor and steel management are unable to agree on a new collective bargaining contract.

It is now becoming apparent that there's more to the steel boom than

strike hedging. The business recovery has been stronger than expected, and more steel is being used than anticipated. This has offset to some extent the drive to build up stocks.

Automotive Looks Ahead—The auto companies have even started to line up steel for their 1960 models. Scattered orders in new sizes for next year's cars are starting to hit the mills. Auto firms are just placing the orders, not making releases. But the moves indicate they want to be sure to get on the books. Most expect to issue the releases for May or June delivery.

Steel service centers (warehouses) also are running into problems. In the Midwest, service centers actually are out of some sizes and gages of sheet, and are beginning to have some trouble with certain bar sizes.

Warehouse Allocations—Allocation of steel to service center customers is becoming increasingly common. This is something that hasn't happened to steel warehouses

since the steel shortage of 1955.

Defense priorities are becoming more of a factor in the steel market. A few defense contractors are insisting that their priorities be honored by the mills. Some mills report the priorities have been used to get better delivery on light plate for government installations. Bars, too, have been put under priority, particularly for West Coast construction work.

Business Begets Business—Priorities may have a more critical effect in the months ahead, notably in stainless and high alloys for aircraft and missile work. Strike-hedge buying already is firming up demand for these products.

Meanwhile, strength of the steel market is in itself generating better business in related fields. For example, the rise in steel output has increased railroad traffic. This has helped bring a speedup in car building and car repair. This in turn has brought high production levels for makers of freight car bearings.

Steel Output, Operating Rates

Production (Net tons, 000 omitted)	This Week	Last Week	Month Ago	Year Ago
Ingot Index (1947-1949=100)	165.7	164.8	163.8	80.0
Operating Rates				
Chicago	95.0	95.0	94.0	54.0
Pittsburgh	95.5	94.5*	94.0	49.0
Philadelphia	99.0	97.0	98.0	54.0
Valley	90.0	90.5*	95.0	34.0
West	92.5	93.0	91.0	68.0
Cleveland	97.0	97.0*	96.5	25.5
Detroit	97.0	97.0*	101.0	12.0
Buffalo	105.0	105.0	105.0	39.0
South Ohio River	99.0	90.0	91.0	48.0
South	95.0	91.5	90.0	54.5
Upper Ohio River	96.0	98.0*	94.0	64.0
St. Louis	89.0	77.0*	89.0	55.0
Aggregate	94.0	93.5	93.0	47.6

*Revised

Prices At a Glance

	This Week	Week Ago	Month Ago	Year Ago
(Cents per lb unless otherwise noted)				
Composite price				
Finished Steel, base	6.196	6.196	6.196	5.967
Pig Iron (gross ton)	\$66.41	\$66.41	\$66.41	\$66.49
Scrap No. 1 hvy (Gross ton)	\$35.17	\$36.50	\$40.83	\$32.83
No. 2 bundles	\$23.17	\$24.17	\$28.67	\$24.17
Nonferrous				
Aluminum ingot	26.80	26.80	26.80	26.10
Copper, electrolytic	31.50	31.50	31.50	25.00
Lead, St. Louis	10.80	10.80	11.30	11.80
Magnesium	36.00	36.00	36.00	36.00
Nickel, electrolytic	74.00	74.00	74.00	74.00
Tin, Straits, N. Y.	102.25	102.625*	103.50	92.25
Zinc, E. St. Louis	11.00	11.00	11.00	10.00

How Inventory Control Pays Off

Sound inventory control has sales benefits, according to Joseph Lasko, purchaser for American Stamping Co.

It gives company competitive edge, aids in filling unexpected order increases.

■ Close control over steel inventories—just about as close as humanly possible—is paying off regularly for one of the largest Cleveland contract stampers, American Stamping Co., and its purchasing agent, Joseph E. Lasko.

"This business is characterized by the need for a fast answer to customers while they hang on the line," says Mr. Lasko. "So our system of daily inventory checks has paid off time and again through up-to-date information for custom-

ers. It frequently brings in business we otherwise wouldn't get. And it gives us a competitive edge, especially in times like the present inventory build-up."

(For a story on the purchasing of stampings see Special Report on p. 77.)

What's Involved—American's inventory control systems covers about 150,000 tons of cut length, flat rolled steel a year in 400 different size and gage combinations. The steel, which comes from 10 mills, goes out as about half a million parts a month of larger pieces. To hold down scrap, only $\frac{1}{8}$ in. extra is allowed around the finished part diameter so correct sizes are important.

How Control Works—The perpetual inventory is kept based on daily shop reports as soon as shear-

ing or blanking is completed. The inventory reports show daily consumption, down to single sheets. Remaining steel is also noted on final inventory reports as well as the delivery promises of tonnage on order. All incoming sheets for new applications must pass an Olsen ductility test.

Incoming orders are put right into purchasing to get steel lined up. Auto customers, who represent the bulk of the business, issue 30-60-90-day forecasts and issue releases against a single order number. Steel purchases are authorized by big auto customers based on the forecasts. And releases are on tight 2-3 week lead times.

Early Start on Buildup—American started building its inventory last December to meet the current rush. And business is currently at record levels. Through its regular inventory control, it appears there will be no shortage, thanks to the early ordering and present good shipments by mills.

Regular management meetings which include purchasing are held at American. Purchasing is represented at these and many policies get heavy analysis. In addition, Mr. Lasko is a member of the Cleveland chapter of the National Association of Purchasing Agents and a suburban purchasing group.

American's major product is brake drum parts for autos and trucks and axle covers. Parts are made from 0.025 in. to 0.375 in. and up to 30 in. in diameter. Welding, assembly, inspection and testing can also be handled. Stamping presses range from 20 tons to 1000 tons plus blanking presses and shears. The firm also makes all its own tools and dies which are stored in unique 17-high indexed racks.

Lasko on Inventory Control

Here's how Joseph Lasko, purchasing agent, American Stamping Co., feels about the need for close inventory regulation:

"Tight inventory control is an absolute must these days—especially since so much capital is tied up in it and it can so easily get out of hand.

"At American we get daily reports on shearing and blanking. We know just how much steel was used up, how much is left, how much is on the way, and the sizes, gages, and analysis.

"Time and again (this system) has made us flexible enough to absorb increases in releases from customers, to change gages, or take up the slack in an emergency."

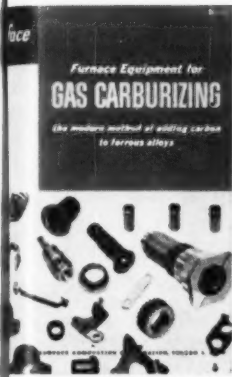




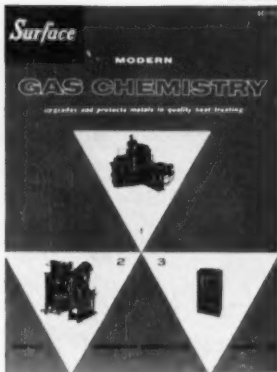
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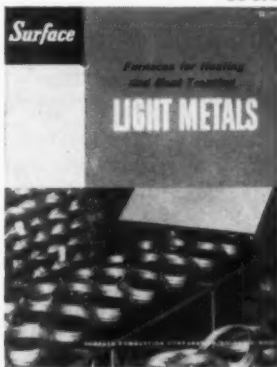
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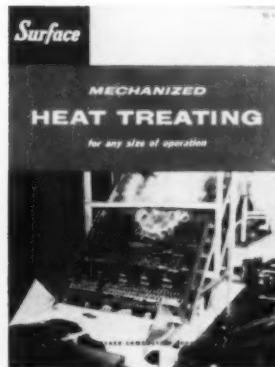
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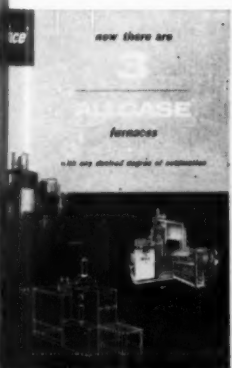
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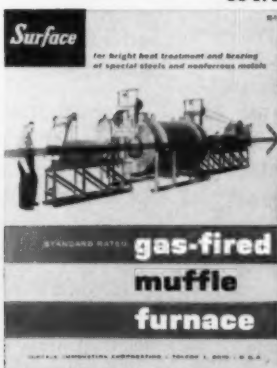
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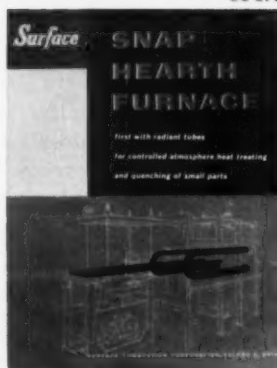
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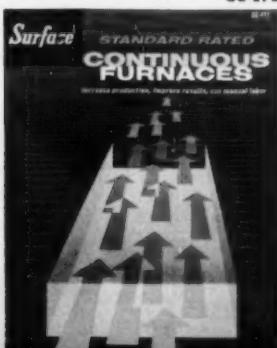
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Mill Carryovers Are Increasing

Problems, present and future, pile up as mills carry over unfilled orders to the following month.

This may delay April and May tonnages. But it also means some June orders won't be shipped by July 1.

■ Steel mill carryovers are growing. This tonnage represents the unfilled orders steelmakers must carry over from one month to the next. The production backlogs create two problems for steel users:

First, they may delay April and May orders. Second, they probably mean some June orders won't get out of the mills by July 1.

These mill carryovers have been building up for the last two months. But, as the second quarter advances, they get more and more critical. Right now, for instance, carryovers at one Eastern mill would absorb all its June tonnage. And this backlog is in addition to regular June bookings which are heavy.

Carryovers on sheet, bar, and plate are running as high as six weeks at some Midwestern mills. These unfilled promises are crippling the inventory building plans of some steel users. Other buyers, faced with increased production schedules, are complaining about shipping delays.

Carryover delays bring dual headaches when the tonnage is intended for steel service centers. If warehouse shipments are held up, the distributors, in turn, may have to cut back on customer allotments.

Order interest has now fanned out well beyond sheet, strip, plate and bar. Stainless and alloy steel sales are climbing. Pig iron orders (see below) are much improved. Standard pipe sales are finally starting to move upward. Tinplate remains strong.

Sheet and Strip—Buyers have now nailed down second quarter tonnage requests with firm orders. There are very few cancellations. And in most cases customers are not asking for more steel than they had originally ordered.

Pittsburgh mills say third quarter orders are coming in, but show no unusual trends. An **East Coast** producer comments, "So far the tonnage on individual third quarter orders is small. And orders are from customers who can estimate their needs far in advance."

Cleveland mills say they are holding third quarter bookings to normally-ordered tonnages. Automotive steel buyers there are already placing some sheet orders for use on 1960 cars. The automakers are also trying to juggle present orders to match current production needs.

PURCHASING AGENT'S CHECKLIST

Oxygen steelmaking furnaces developed in Sweden will be sold in U. S. P. 80

Industrial incinerator sales rise as refuse disposal becomes greater problem. P. 85

Four new stainless alloys, known as PH-55 Alloys, are introduced by Cooper Alloy Corp. P. 118

Sheet mills at **Chicago** are operating with 4-6 week carryovers. Strip mills are at full capacity levels. Buyers in that area hope the mills can hold June carryovers to less than four weeks.

Plates and Shapes—Construction steel products, especially structurals, are among the less active areas of the market. But a lot depends on the sales area. At **Chicago**, for example, structural mills are loaded with orders. Both standard shapes and wide flange beams are booked solid through the first half.

However, **East Coast** producers still have standard structurals for May and June delivery. And one mill man there says more than 50 pct of the buying probably represents strike hedging.

Sheared mill plate makers are about booked out for the first half. Light plate is in strong demand, both in the **Midwest** and in the **East**.

Pig Iron—Orders have risen sharply with some **Midwest** sellers reporting sales more than 100 pct above year-ago levels. **Chicago** producers predict foundry pig iron production may reach an all-time record this month. So far deliveries are still current. However, it's expected the drain on producers' stock will show up soon.

One reason for the buying upsurge: Foundries have started to order in earnest, both for customers and for their own strike hedging.

Record Steel Output—Steel production in March (11.5 million net tons of ingots and steel for castings) set a new monthly record, according to the American Iron and Steel Institute.

In addition, production for the entire first quarter of this year was 30.4 million tons, largest amount made since the first quarter of 1957 when output was 31.5 million tons.

New Bethlehem Mill—Construction will start this July on a new reinforcing bar mill at the Steelton, Pa., plant of Bethlehem Steel Co. The mill will have an annual capacity of 350,000 tons. It will produce sizes from No. 3 bar to No. 11 bar.

COMPARISON OF PRICES

(Effective April 14, 1959)

Steel prices on this page are the average of various f.o.b. quotations of major producing areas: Pittsburgh, Chicago, Gary, Cleveland Youngstown.

Price advances over previous week are printed in **Heavy Type**; declines appear in *Italics*.

	Apr. 14 1959	Apr. 7 1959	Mar. 17 1959	Apr. 15 1958
Flat-Rolled Steel: (per pound)				
Hot-rolled sheets	5.10¢	5.10¢	5.10¢	4.925¢
Cold-rolled sheets	6.275	6.275	6.275	6.05
Galvanized sheets (10 ga.)	6.875	6.875	6.875	6.60
Hot-rolled strip	5.10	5.10	5.10	4.925
Cold-rolled strip	7.425	7.425	7.425	7.17
Plate	5.30	5.30	5.30	5.12
Plates, wrought iron	13.55	13.55	13.55	13.15
Stainl's C-R strip (No. 302)	52.00	52.00	52.00	52.00
Tin and Terneplate: (per base box)				
Tinplate (1.50 lb.) cokes	\$10.65	\$10.65	\$10.65	\$10.30
Tin plates, electro (0.50 lb.)	9.35	9.35	9.35	9.00
Special coated mfg. ternes	9.90	9.90	9.90	9.55
Bars and Shapes: (per pound)				
Merchant bar	5.675¢	5.675¢	5.675¢	5.425¢
Cold finished bar	7.65	7.65	7.65	7.30
Alloy bars	6.725	6.725	6.725	6.475
Structural shapes	5.50	5.50	5.50	5.275
Stainless bars (No. 302)	46.75	46.75	45.00	45.00
Wrought iron bars	14.90	14.90	14.90	14.45
Wire: (per pound)				
Bright wire	8.00¢	8.00¢	8.00¢	7.65¢
Rails: (per 100 lb.)				
Heavy rails	\$5.75	\$5.75	\$5.75	\$5.525
Light rails	6.725	6.725	6.725	6.50
Semifinished Steel: (per net ton)				
Rerolling billets	\$80.00	\$80.00	\$80.00	\$77.50
Slabs, rerolling	80.00	80.00	80.00	77.50
Forging billets	99.50	99.50	99.50	96.00
Alloys blooms, billets, slabs	119.00	119.00	119.00	114.00
Wire Rods and Skelp: (per pound)				
Wire rods	6.40¢	6.40¢	6.40¢	6.15¢
Skelp	5.05	5.05	5.05	4.875
Finished Steel Composite: (per pound)				
Base price	6.196¢	6.196¢	6.196¢	5.967¢

Finished Steel Composite

Weighted index based on steel bars, shapes, plates, wire, rails, black pipe, hot and cold rolled sheets and strips.

Pig Iron Composite

Based on averages for basic iron at Valley furnaces and foundry iron at Chicago, Philadelphia, Buffalo and Birmingham.

Steel Scrap Composites

Average of No. 1 heavy melting steel scrap and No. 2 bundles delivered to consumers at Pittsburgh, Philadelphia and Chicago.

	Apr. 14 1959	Apr. 7 1959	Mar. 17 1959	Apr. 15 1958
Pig Iron: (per gross ton)				
Foundry, del'd Phila.	\$70.57	\$70.57	\$70.57	\$70.97
Foundry, Southern Cin'ti	73.87	73.87	73.87	73.87
Foundry, Birmingham	62.50	62.50	62.50	62.50
Foundry, Chicago	66.50	66.50	66.50	66.50
Basic, del'd Philadelphia	70.07	70.07	70.07	70.47
Basic, Valley furnace	66.00	66.00	66.00	66.00
Malleable, Chicago	66.50	66.50	66.50	66.50
Malleable, Valley	66.50	66.50	66.50	66.50
Ferromanganese, 74-76 pct Mn, cents per lb½	12.25	12.25	12.25	12.25
Pig Iron Composite: (per gross ton)				
Pig iron	\$66.41	\$66.41	\$66.41	\$66.49
Scrap: (per gross ton)				
No. 1 steel, Pittsburgh	\$38.50	\$39.50	\$44.50	\$32.50
No. 1 steel, Phila. area	33.50	34.50	37.50	36.50
No. 1 steel, Chicago	33.50	35.50	40.50	29.50
No. 1 bundles, Detroit	32.50	32.50	37.50	21.50
Low phos., Youngstown	40.50	41.50	45.50	32.50
No. 1 mach'y cast, Pittsburgh	49.50	49.50	51.50	49.50
No. 1 mach'y cast, Phila.	49.50	49.50	49.50	47.50
No. 1 mach'y cast, Chicago	53.50	54.50	55.50	43.50
Steel Scrap Composite: (per gross ton)				
No. 1 hvy. melting scrap	\$35.17	\$36.50	\$40.83	\$32.83
No. 2 bundles	23.17	24.17	28.67	24.17
Coke, Connellsville: (per net ton at oven)				
Furnace coke, prompt	\$14.50-15.50	\$14.50-15.50	\$14.50-15.50	\$15.38
Foundry coke, prompt	18.50	18.50	18.50	17.50-19
Nonferrous Metals: (cents per pound to large buyers)				
Copper, electrolytic, Conn.	31.50	31.50	31.50	25.00
Copper, Lake, Conn.	31.50	31.50	31.50	25.00
Tin, Straits, N. Y.	102.25†	102.625*	103.50	92.25
Zinc, East St. Louis	11.00	11.00	11.00	10.00
Lead, St. Louis	10.80	10.80	11.30	11.80
Aluminum, virgin ingot	26.80	26.80	26.80	26.10
Nickel, electrolytic	74.00	74.00	74.00	74.00
Magnesium, ingot	36.00	36.00	36.00	36.00
Antimony, Laredo, Tex.	29.50	29.50	29.50	29.50

† Tentative. ‡ Average. * Revised.

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Mills Nibble Away At Scrap Prices

Mills have been able to limit their purchases of dealer scrap to distress material.

Further drops are possible as Composite Price nears recession low-point.

■ Prices plunged again in most major districts and hope that the scrap market reached the bottom has flown out the window.

For many months dealers have been operating on a low volume, low profit basis. Their inventories are high and pressure to sell is heavy. The mills are holding all the cards. Mills are having no trouble getting what little dealer scrap they want at lower prices.

It's small comfort to the dealers that this week's No. 1 heavy melting Composite Price is still \$3.67 higher than the recession low-point, reached on April 29, 1958.

Adding to low morale in the scrap market are the first reports of some mills beginning to cut back on scrap inventory—the early signs of the summer lull and a possible steel strike. No one is betting on a strong market this spring.

Based on a \$2 drop in Chicago and in a \$1 drop in Pittsburgh and Philadelphia, The IRON AGE No. 1 heavy melting Composite Price this week slipped \$1.33 to \$35.17.

Pittsburgh—Price of No. 1 heavy melting dropped another \$1 this week. Prices of No. 2 openhearth grades also fell \$1. Industrial and railroad scrap stiffened as consumers found these grades attractive at current levels. The dealer market has fallen to the point where

collections have slowed. Any sustained buying could bring a sharp rebound. However, there is no real confidence this will happen. Mills have been able to limit purchases to quantities that are available at low prices.

Chicago—Offers to buy at reduced prices by a district mill have been bringing some sales. Other district mills began curtailing purchases sharply. First shipments of ore from the Lakes arrived in Chicago this week, adding to the general scrap market depression. The price picture is further confused by continued movement of large tonnages of scrap on old orders at substantially higher prices.

Philadelphia—Prices of most openhearth grades slipped another \$1 on spot purchases by a district mill. No. 1 busheling is the only openhearth grade holding its own. Machine shop turnings price is down \$1 but shoveling turnings held at \$23-\$24 on basis of a small purchase. New export orders are expected soon.

New York—Heavy melting grades have fallen \$1 due to lack of orders. Domestic business is only a trickle and export is very slow. Other prices are unchanged but little material is moving, with the exception of cast. Pipe foundries continue to buy fair-sized quantities.

Detroit—Faced with what they term "a rapidly deteriorating market," dealer pessimism is growing over prospects for the coming months. Prices offered by outside buyers are too low to attract much scrap from this area. A number of

yards are refusing to accept turnings from peddlers at any price.

Cleveland—Market is treading water with major shipments restricted to railroad and industrial tonnages. Dealers are being bypassed except for small special lots. The probability is growing that the market will stay at present level for some weeks. Eastern distress scrap is still coming into the Valley by truck at \$38 for prime grades.

St. Louis—Openhearth scrap prices continue to drop. Mills are buying small tonnages of No. 1 and No. 2 heavy melting at \$2 under last week's prices. No. 2 bundles dropped \$3. Turnings are off \$1.

Birmingham—An Atlanta mill came back into the market this week with sizable purchases at \$4 a ton under its last price. Brokers say it is questionable that the bottom has yet been reached. Cast is barely holding its own.

Cincinnati—Market is in mid-month lull with most shipments completed and no new orders around. One mill is beginning a scrap inventory cutback and dealers are more or less on allocation.

Buffalo—Prices are unchanged in an inactive market. Dealers have mixed feelings about the future. Some feel prices will hold at present levels. Others feel another drop may be coming.

Boston—There is virtually no activity in this market. Machine shop turnings dropped \$2 to \$7-\$8 and shoveling turnings are off \$1 at \$11-\$12.

West Coast—Market is in the doldrums. Mills are taking only enough to meet their melt. Export is the only strong factor.

Houston—The market is quiet although brokers are still filling the district mill's order for April at what they consider good prices. Yard intake has slowed down. Lower domestic and export prices are anticipated.

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SCRAP PRICES (Effective April 14, 1959)

Pittsburgh

No. 1 hvy. melting	\$38.00 to \$39.00
No. 2 hvy. melting	29.00 to 30.00
No. 1 dealer bundles	41.00 to 42.00
No. 1 factory bundles	45.00 to 46.00
No. 2 bundles	26.00 to 27.00
No. 1 busheling	41.00 to 42.00
Machine shop turn.	21.00 to 22.00
Shoveling turnings	27.00 to 28.00
Cast iron borings	27.00 to 28.00
Low phos. punch'g plate	45.00 to 46.00
Heavy turnings	30.00 to 31.00
No. 1 RR hvy. melting	41.00 to 42.00
Scrap rails, random lgth.	52.00 to 53.00
Rails 2 ft and under	56.00 to 57.00
RR specialties	47.00 to 48.00
No. 1 machinery cast.	49.00 to 50.00
Cupola cast.	45.00 to 46.00
Heavy breakable cast.	43.00 to 44.00
Stainless	
18-8 bundles and solids	230.00 to 235.00
18-8 turnings	120.00 to 125.00
430 bundles and solids	130.00 to 135.00
430 turnings	55.00 to 60.00

Chicago

No. 1 hvy. melting	\$33.00 to \$34.00
No. 2 hvy. melting	30.00 to 31.00
No. 1 dealer bundles	33.00 to 34.00
No. 1 factory bundles	39.00 to 40.00
No. 2 bundles	21.00 to 22.00
No. 1 busheling	33.00 to 34.00
Machine shop turn.	15.00 to 16.00
Mixed bor. and turn.	17.00 to 18.00
Shoveling turnings	17.00 to 18.00
Cast iron borings	17.00 to 18.00
Low phos. forge crops	45.00 to 46.00
Low phos. punch'g plate	
1/4 in. and heavier	43.00 to 44.00
Low phos. 2 ft and under	41.00 to 42.00
No. 1 RR hvy. melting	39.00 to 40.00
Scrap rails, random lgth.	45.00 to 46.00
Rolling rails	57.00 to 58.00
Rails 2 ft and under	53.00 to 54.00
Angles and splice bars	48.00 to 49.00
RR steel car axles	55.00 to 56.00
RR couplers and knuckles	46.00 to 47.00
No. 1 machinery cast.	53.00 to 54.00
Cupola cast.	46.00 to 47.00
Cast iron wheels	40.00 to 41.00
Malleable	54.00 to 55.00
Stove plate	43.00 to 44.00
Steel car wheels	44.00 to 45.00
Stainless	
18-8 bundles and solids	220.00 to 225.00
18-8 turnings	120.00 to 125.00
430 bundles and solids	115.00 to 120.00
430 turnings	55.00 to 60.00

Philadelphia Area

No. 1 hvy. melting	\$33.00 to \$34.00
No. 2 hvy. melting	27.00 to 28.00
No. 1 dealer bundles	36.00 to 37.00
No. 2 bundles	21.00 to 22.00
No. 1 busheling	35.00 to 36.00
Machine shop turn.	17.00 to 19.00
Mixed bor. short turn.	17.00 to 19.00
Cast iron borings	17.00 to 19.00
Shoveling turnings	23.00 to 24.00
Clean cast. chem. borings	30.00 to 31.00
Low phos. 5 ft and under	39.00 to 40.00
Low phos. 2 ft punch'g's	41.00 to 42.00
Elec. furnace bundles	38.00 to 39.00
Heavy turnings	32.00 to 33.00
RR specialties	42.00 to 43.00
Rails 18 in. and under	58.00 to 60.00
Cupola cast.	40.00 to 41.00
Heavy breakable cast.	42.00 to 43.00
Cast iron car wheels	44.00 to 45.00
Malleable	67.00 to 68.00
No. 1 machinery cast.	49.00 to 50.00

Cincinnati

Brokers buying prices per gross ton on cars:	
No. 1 hvy. melting	\$34.00 to \$35.00
No. 2 hvy. melting	27.50 to 28.50
No. 1 dealer bundles	34.00 to 35.00
No. 2 bundles	21.00 to 22.00
Machine shop turn.	15.00 to 16.00
Shoveling turnings	18.00 to 19.00
Cast iron borings	17.00 to 18.00
Low phos. 18 in. and under	41.00 to 42.00
Rails, random length	47.00 to 48.00
Rails, 18 in. and under	54.00 to 55.00
No. 1 cupola cast.	43.00 to 44.00
Hvy. breakable cast.	40.00 to 41.00
Drop broken cast.	48.00 to 49.00

Youngstown

No. 1 hvy. melting	\$39.00 to \$40.00
No. 2 hvy. melting	31.00 to 32.00
No. 1 dealer bundles	39.00 to 40.00
No. 2 bundles	24.00 to 25.00
Machine shop turn.	22.00 to 23.00
Shoveling turnings	22.00 to 23.00
Low phos. plate	40.00 to 41.00

Iron and Steel Scrap

Going prices of iron and steel scrap as obtained in the trade by THE IRON AGE based on representative tonnages. All prices are per gross ton delivered to consumer unless otherwise noted.

Cleveland

No. 1 hvy. melting	\$35.50 to \$36.50
No. 2 hvy. melting	28.50 to 29.50
No. 1 dealer bundles	35.50 to 36.50
No. 1 factory bundles	41.00 to 42.00
No. 2 bundles	20.50 to 21.50
No. 1 busheling	35.50 to 36.50
Machine shop turn.	16.00 to 17.00
Mixed bor. and turn.	21.00 to 22.00
Shoveling turnings	21.00 to 22.00
Cast iron borings	21.00 to 22.00
Cut structural & plates, 2 ft and under	40.00 to 41.00
Drop forge flashings	35.50 to 36.50
Low phos. punch'g plate	36.50 to 37.50
Foundry steel, 2 ft and under	36.00 to 37.00
No. 1 RR hvy. melting	39.00 to 40.00
Rails 2 ft and under	56.00 to 57.00
Rails 18 in. and under	57.00 to 58.00
Steel axle turnings	24.00 to 25.00
Railroad cast	53.00 to 54.00
No. 1 machinery cast.	51.00 to 52.00
Stove plate	48.00 to 49.00
Malleable	66.00 to 67.00
Stainless	
18-8 bundles	210.00 to 220.00
18-8 turnings	115.00 to 120.00
430 bundles	120.00 to 125.00

Buffalo

No. 1 hvy. melting	\$34.00 to \$35.00
No. 2 hvy. melting	29.00 to 30.00
No. 1 busheling	34.00 to 35.00
No. 1 dealer bundles	34.00 to 35.00
No. 2 bundles	24.00 to 25.00
Machine shop turn.	17.00 to 18.00
Mixed bor. and turn.	19.00 to 20.00
Shoveling turnings	21.00 to 22.00
Cast iron borings	19.00 to 20.00
Low phos. plate	39.00 to 40.00
Structurals and plate	
2 ft and under	43.00 to 44.00
Scrap rails, random lgth.	41.00 to 42.00
Rails 2 ft and under	51.00 to 52.00
No. 1 machinery cast.	51.00 to 52.00
No. 1 cupola cast.	47.00 to 48.00

St. Louis

No. 1 hvy. melting	\$33.00 to \$34.00
No. 2 hvy. melting	31.00 to 32.00
No. 1 dealer bundles	37.00 to 38.00
No. 2 bundles	23.00 to 24.00
Machine shop turn.	14.00 to 15.00
Shoveling turnings	16.00 to 17.00
Cast iron borings	19.00 to 20.00
No. 1 RR hvy. melting	38.00 to 39.00
Rails, random lengths	46.00 to 47.00
Rails, 18 in. and under	50.00 to 51.00
Angles and splice bars	46.00 to 47.00
RR specialties	42.00 to 43.00
Cupola cast	49.00 to 50.00
Heavy breakable cast.	40.00 to 41.00
Cast iron brake shoes	37.00 to 38.00
Stove plate	44.50 to 45.50
Cast iron car wheels	42.00 to 43.00
Rerolling rails	58.00 to 59.00
Unstripped motor blocks	41.00 to 42.00

Birmingham

No. 1 hvy. melting	\$30.00 to \$31.00
No. 2 hvy. melting	25.00 to 26.00
No. 1 dealer bundles	30.00 to 31.00
No. 2 bundles	21.00 to 22.00
No. 1 busheling	30.00 to 31.00
Machine shop turn.	23.00 to 24.00
Shoveling turnings	24.00 to 25.00
Cast iron borings	14.00 to 15.00
Electric furnace bundles	36.00 to 37.00
Elec. furnace, 3 ft & under	33.00 to 34.00
Bar crops and plate	40.00 to 41.00
Structural and plate, 2 ft.	39.00 to 40.00
No. 1 RR hvy. melting	33.00 to 34.00
Scrap rails, random lgth.	41.00 to 42.00
Rails, 18 in. and under	49.00 to 50.00
Angles and splice bars	43.00 to 44.00
Rerolling rails	52.00 to 53.00
No. 1 cupola cast.	53.00 to 54.00
Stove plate	53.00 to 54.00
Cast iron car wheels	40.00 to 41.00
Unstripped motor blocks	40.00 to 41.00

New York

Brokers buying prices per gross ton on cars:	
No. 1 hvy. melting	\$26.00 to \$27.00
No. 2 hvy. melting	21.00 to 22.00
No. 2 dealer bundles	17.00 to 18.00
Machine shop turnings	10.00 to 11.00
Mixed bor. and turn.	13.00 to 14.00
Shoveling turnings	15.00 to 16.00
Clean chem. cast. borings	23.00 to 25.00
No. 1 machinery cast.	37.00 to 38.00
Mixed yard cast.	35.00 to 36.00
Heavy breakable cast.	33.00 to 34.00
Stainless	
18-8 prepared solids	195.00 to 200.00
18-8 turnings	85.00 to 90.00
430 prepared solids	85.00 to 90.00
430 turnings	20.00 to 25.00

Detroit

Brokers buying prices per gross ton on cars:	
No. 1 hvy. melting	\$30.00 to \$31.00
No. 2 hvy. melting	21.00 to 22.00
No. 1 dealer bundles	32.00 to 33.00
No. 2 bundles	17.00 to 18.00
No. 1 busheling	30.00 to 31.00
Drop forge flashings	29.00 to 30.00
Machine shop turn.	12.00 to 13.00
Mixed bor. and turn.	14.00 to 15.00
Shoveling turnings	14.00 to 15.00
Cast iron borings	14.00 to 15.00
Heavy breakable cast.	32.00 to 33.00
Mixed cupola cast.	41.00 to 42.00
Automotive cast.	47.00 to 48.00
Stainless	
18-8 bundles and solids	210.00 to 215.00
18-8 turnings	100.00 to 105.00
430 bundles and solids	105.00 to 110.00

Boston

Brokers buying prices per gross ton on cars:	
No. 1 hvy. melting	\$24.00 to \$25.00
No. 2 hvy. melting	20.00 to 21.00
No. 1 dealer bundles	24.00 to 25.00
No. 2 bundles	17.00 to 18.00
No. 1 busheling	24.00 to 25.00
Machine shop turn.	7.00 to 8.00
Shoveling turnings	11.00 to 12.00
Clean cast. chem. borings	16.00 to 17.00
No. 1 machinery cast.	33.00 to 34.00
Mixed cupola cast.	33.00 to 34.00
Heavy breakable cast.	31.00 to 32.00
Stove plate	29.00 to 30.00

San Francisco

No. 1 hvy. melting	\$36.00
No. 2 hvy. melting	33.00
No. 1 dealer bundles	\$32.00 to 34.00
No. 2 bundles	22.00
Machine shop turn.	17.00
Cast iron borings	17.00
No. 1 cupola cast.	45.00

Los Angeles

No. 1 hvy. melting	\$38.00
No. 2 hvy. melting	36.00
No. 1 dealer bundles	35.00
No. 2 bundles	18.00
Machine shop turn.	\$16.00 to 17.00
Shoveling turnings	18.00 to 19.00
Cast iron borings	18.00 to 19.00
Elec. furn. 1 ft and under (foundry)	49.00
No. 1 cupola cast.	45.00

Seattle

No. 1 hvy. melting	\$35.00
No. 2 hvy. melting	33.00
No. 2 bundles	22.00
No. 1 cupola cast.	36.00
Mixed yard cast.	36.00

Hamilton, Ont.

Brokers buying prices per gross ton on cars:	
No. 1 hvy. melting	\$32.25
No. 2 hvy. melting	28.25
No. 1 dealer bundles	32.25
No. 2 bundles	22.75
Mixed steel scrap	24.25
Bush., new fact., prep'd.	32.25
Bush., new fact., unprep'd	26.25
Machine shop turn.	14.00
Short steel turn.	17.00
Mixed bor. and turn.	13.00
Rails, rerolling	37.00
Cast scrap	\$46.50 to 48.00

Houston

Brokers buying prices per gross ton on cars:	
No. 1 hvy. melting	\$36.00
No. 2 hvy. melting	33.00
No. 2 bundles	22.00
Machine shop turn.	16.00
Shoveling turnings	20.00
Cut structural plate	
2 ft & under	\$43.50 to 44.50
Unstripped motor blocks	38.00 to 39.00
Cupola cast.	45.00 to 46.00
Heavy breakable cast.	27.00 to 28.00

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LEADERS IN IRON AND STEEL SCRAP SINCE 1889



Copper Market Is Changing

While producers are still doing good business, custom smelters have had to cut their prices.

The trade has some ideas on why, and what.

■ The copper market now appears to be going in two directions at once.

Producers are still besieged by buyers. The sales head of one producer says his company is turning away some business, and is actually using an informal allotment system.

Custom Buying Off—But custom smelters had to drop their prices twice within the last week to move metal. They started the week only $\frac{1}{2}$ ¢ per lb above producers in an apparently strong market.

Why? Several theories are circulating through the trade. Most likely is a combination of some of the following.

Most observers believe copper supply lines are starting to get full. One points out that for most of the year world production has been scheduled at record levels. There has been almost certainly an excess of supply over actual consumption.

Here's Why—Best bet: Fabricator inventories of copper aren't much above normal for current rate of business. But their customers probably have twice as much of the fabricated metal as they need for production. Both are still interested in hedging, but not at a premium.

Another possibility is that profit taking by speculators has pulled up

buyers who had been running scared. Futures players have been climbing out of the market regularly for the last week or so. They have driven it down by about 123 pts. Any buyer whose inventory was starting to get long is probably now pausing for breath.

Also, this futures weakness appears to have jarred loose scrap. It is now moving freely, for slightly lower prices than a few weeks ago. This means custom smelters have more metal to sell, and astute buyers know this.

On the labor picture, you have to look close to see it, but a tinge of optimism is showing through. Support is still slight but growing for the idea that the industry might get through 1959 without major strikes.

Labor Peace, Maybe—Says one custom smelter, "Most of our customers still think there'll be strikes when the contracts run out between Mine, Mill and the companies. But I'm betting there'll be a steel strike, but no copper strike."

The extremes of opinion on today's market are well summed up in this difference between copper men.

Said one, "Maybe the customer has become a sophisticated hedger-interested in the metal, but also the price."

"No", said the other. "PA's panicked and bought everything in sight a few months ago. Now, they're just trying to figure out where they are, and what they've got."

Wire and Cable

Anaconda Wire and Cable Co. has a new \$1.75 million extra-high voltage research laboratory up the Hudson River at Hastings, N. Y.

The company figures if the electric industry grows at anything near the pace predicted for it, there'll be a corresponding boom for extra-high voltage, insulated cable. Anaconda aims to have the facilities to meet this trend and keep quality up.

The company figures there'll be demand for cable that will transmit 500,000 kva and over, at 230 kv and higher.

Aluminum

Shipments of sheet and plate in February topped January, according to the Aluminum Assn. The difference was a gain from 18.3 million lb to 20.6 million lb by heat-treatable.

But the drop in non-heat-treatable from 85.3 million lb to 84.1 million lb was negligible considering February was a shorter month.

Tin prices for the week: April 8 — 102.50; April 9 — 102.625; April 10 — 102.50; April 13 — 102.25; April 14—102.25.*

* Estimate.

Primary Prices

(cents per lb)	current price	last price	date of change
Aluminum pig	24.75	24.00	8/1/59
Aluminum ingot	26.80	26.10	8/1/59
Copper (E)	31.86	30.00	3/9/59
Copper (CS)	32.00	33.00	4/13/59
Copper (L)	31.50	30.00	3/9/59
Lead, St. L.	10.80	11.30	4/1/59
Lead, N. Y.	11.00	11.50	4/1/59
Magnesium ingot	28.00	34.00	8/13/59
Magnesium pig	28.25	33.75	8/13/59
Nickel	74.00	84.50	12/8/58
Titanium sponge	162-162	195-205	11/3/58
Zinc, E. St. L.	11.00	11.50	2/29/59
Zinc, N. Y.	11.50	12.00	2/29/59

ALUMINUM: 99% ingot fnt allwd. **COPPER:** (E) = electrolytic, (CS) = custom smelters, electrolytic. (L) = lake. **LEAD:** common grade. **MAGNESIUM:** 99.8% pig Velasco, Tex. **NICKEL:** Port Colbourne, Canada. **ZINC:** prime western. Tin: See above; Other primary prices, pg. 161.

NONFERROUS PRICES

MILL PRODUCTS

(Cents per lb unless otherwise noted)

ALUMINUM

(Base 30,000 lb, f.o.b. ship pt., frt. allowed)

Flat Sheet (Mill Finish and Plate)

("F" temper except 6061-0)

Alloy	.032	.051	.136 .249	.250- 3
1100, 3003.....	45.7	43.8	42.8	43.3
5052.....	53.1	48.4	46.9	46.0
6061-0.....	50.1	45.7	43.9	44.9

Extruded Solid Shapes

Factor	6063 T-5	6062 T-6
6-8.....	42.7-44.2	51.1-54.8
12-14.....	42.7-44.2	52.0-56.5
24-26.....	43.2-44.7	62.8-67.5
36-38.....	46.7-49.2	86.9-90.5

Screw Machine Stock—2011-T-3

Size"	3/4	7/8	1	1 1/4-1 1/2
Price.....	62.0	61.2	59.7	57.3

Roofing Sheet, Corrugated

(Per sheet, 26" wide base, 16,000 lb)

Length"→	72	96	120	144
.019 gage.....	\$1.411	\$1.884	\$2.353	\$2.823
.024 gage.....	1.762	2.349	2.937	3.524

MAGNESIUM

(F.o.b. shipping Pt., carload frt. allowed)

Sheet and Plate

Type→	Gage→	.250 3.00	.250- 2.00	.188	.081	.032
AZ31B Stand, Grade.....		67.9	69.0	77.9	108.1	
AZ31B Spec.....		93.3	95.7	108.7	171.3	
Tread Plate.....		70.6	71.7			
Tooling Plate.....		73.0				

Extruded Shapes

Factor→	6-8	12-14	24-26	36-38
Comm. Grade, (AZ31C).....	69.6	70.7	75.6	89.2
Spec. Grade... (AZ31B).....	84.6	85.7	90.6	104.2

Alloy Ingot

AZ91B (Die Casting)..... 37.25 (delivered)
AZ63A, AZ92A, AZ91C (Sand Casting) 40.75 (Velsco, Tex.)

NICKEL, MONEL, INCONEL

(Base prices f.o.b. mill)

"A" Nickel Monel

	Nickel	Inconel
Sheet, CR.....	126	128
Strip, CR.....	124	138
Rod, bar, HR.....	107	109
Angles, HR.....	107	109
Plates, HR.....	120	121
Seamless tube.....	157	200
Shot, blocks.....	87	...

COPPER, BRASS, BRONZE

(Freight included in 5000 lbs)

	Sheet	Wire	Rod	Tube
Copper.....	55.63	.....	52.88	55.82
Brass, Yellow.....	48.24	48.75	48.18	51.05
Brass, Low.....	51.23	51.77	51.17	54.54
Brass, R L.....	52.29	52.83	52.23	55.60
Brass, Naval.....	52.80	.....	46.61	56.21
Muntz Metal.....	50.85	.....	46.16	.....
Comm. Br.....	53.90	54.44	53.84	56.96
Mang. Br.....	56.54	.....	50.14	.....
Phos. Br. 5%.....	75.34	.....	75.84	.....

Free Cutting Brass Rod..... 32.73

TITANIUM

(Base prices, f.o.b. mill)

Sheet and strip, commercially pure, \$6.90-\$7.40; alloy, \$14.35, Plate, HR, commercially pure, \$5.00-\$5.75; alloy, \$7.75-\$8.50. Wire, rolled and/or drawn, commercially pure, \$5.50-\$6.00; alloy, \$8.00-\$9.50; Bar, HR or forged, commercially pure, \$4.25-\$4.65; alloy, \$4.25-\$7.15; billets, HR, commercially pure, \$3.55-\$4.10; alloy, \$3.55-\$5.75.

PRIMARY METAL

(Cents per lb unless otherwise noted)

Antimony, American, Laredo, Tex. 29.50
Beryllium aluminum 5% Be, Dollar
per lb contained Be.....\$74.75
Beryllium copper, per lb contained Be.....\$43.00
Beryllium 97% lump or beads,
f.o.b. Cleveland, Reading.....\$71.50
Blamuth, ton lots.....\$ 2.25
Cadmium, del'd small lots.....\$ 1.30
Calcium, 99.9%.....\$ 4.55
Chromium, 99.8% metallic basis.....\$ 1.31
Cobalt, 97-99% (per lb).....\$1.75 to \$1.82
Germanium, per gm, f.o.b. Miami
Okla., refined.....\$35.00 to 42.00
Gold, U. S. Treas., per troy oz.....\$35.00
Indium, 99.9%, dollars per troy oz.....\$ 2.25
Iridium, dollars per troy oz.....\$75 to \$85
Lithium, 98%.....\$11.00 to \$14.00
Magnesium, sticks, 100 to 500 lb..... 59.00
Mercury, dollars per 76-lb flask
f.o.b. New York.....\$237 to \$240
Nickel oxide sinter at Buffalo, N. Y.,
or other U. S. points of entry,
contained nickel..... 69.60
Palladium, dollars per troy oz.....\$18 to \$20
Platinum, dollars per troy oz.....\$77 to \$80
Rhodium.....\$120.00 to \$125.00
Silver ingots (¢ per troy oz.).....91.375
Thorium, per kg.....\$43.00
Vanadium.....\$ 3.45
Zirconium sponge.....\$ 5.00

REMELTED METALS

Brass Ingot

(Cents per lb delivered, carloads)
85-5-5 ingot..... 31.25
No. 115..... 30.00
No. 120..... 29.00
No. 123..... 29.00
80-10-10 ingot..... 35.50
No. 305..... 33.50
No. 315..... 44.50
88-10-2 ingot..... 40.25
No. 210..... 36.00
No. 215..... 36.00
No. 245..... 36.00
Yellow ingot..... 25.75
No. 405..... 28.75
Manganese bronze..... 28.75
No. 421..... 28.75

Aluminum Ingot

(Cents per lb del'd 30,000 lb and over)
95-5 aluminum-silicon alloys..... 24.75-25.00
0.30 copper max..... 24.50-24.75
0.60 copper max..... 24.25-25.25
Piston alloys (No. 122 type)..... 21.50-22.50
No. 12 alum. (No. 2 grade)..... 25.00-25.50
10% alloy..... 25.00-25.50
13 alloy (0.60 copper max)..... 24.25-24.75
AXS-679 (1 pct zinc)..... 21.75-22.25

(Effective April 13, 1959)

Steel deoxidizing aluminum notch bar

granulated or shot
Grade 1—95-97 1/2%..... 22.50-23.50
Grade 2—92-95%..... 21.25-22.25
Grade 3—90-92%..... 20.25-21.25
Grade 4—85-90%..... 17.50-18.50

SCRAP METALS

Brass Mill Scrap

(Cents per pound, add 1¢ per lb for shipments of 20,000 lb and over)

	Heavy	Turnings
Copper.....	27 1/4	26 3/4
Yellow brass.....	20 1/2	18 1/2
Red brass.....	24 1/4	23 1/2
Comm. bronze.....	25 1/2	24 1/2
Mang. bronze.....	19 1/2	18 1/2
Free cutting rod ends.....	20 1/2	

Customs Smelters Scrap

(Cents per pound carload lots, delivered to refinery)

No. 1 copper wire..... 27 1/2
No. 2 copper wire..... 26
Light copper..... 24
*Refinery brass..... 25 3/4
Copper bearing material..... 24 3/4
*Dry copper content.

Ingot Makers Scrap

(Cents per pound carload lots, delivered to refinery)

No. 1 copper wire..... 27 1/2
No. 2 copper wire..... 26
Light copper..... 24
No. 1 composition..... 22
No. 1 comp. turnings..... 21 1/2
Hvy. yellow brass solids..... 16 1/2
Brass pipe..... 17
Radiators..... 17 1/2

Aluminum

Mixed old cast..... 12 —13
Mixed new clips..... 15 —16
Mixed turnings, dry..... 13 —14

Dealers' Scrap

(Dealers' buying price f.o.b. New York in cents per pound)

Copper and Brass

No. 1 copper wire..... 24 1/4 —25 1/4
No. 2 copper wire..... 22 3/4 —23 1/4
Light copper..... 20 3/4 —21 1/4
Auto radiators (unsweated)..... 15 —15 1/2
No. 1 composition..... 19 1/2 —20
No. 1 composition turnings..... 18 —18 1/2
Cocks and faucets..... 15 1/2 —16
Clean heavy yellow brass..... 14 —14 1/4
Brass pipe..... 15 1/2 —16
New soft brass clippings..... 16 1/4 —16 3/4
No. 1 brass rod turnings..... 13 1/2 —14

Aluminum

Alum. pistons and struts..... 6 —6 1/2
Aluminum crankcase..... 9 1/2 —10
1100 (2a) aluminum clippings..... 13 —13 1/2
Old sheet and utensils..... 9 1/2 —10
Borings and turnings..... 6 —6 1/2
Industrial castings..... 9 1/2 —10
2020 (24S) clippings..... 11 —11 1/2

Zinc

New zinc clippings..... 4 1/2 —5 1/4
Old zinc..... 3 1/4 —3 1/2
Zinc routings..... 2 —2 1/4
Old die cast scrap..... 1 1/4 —2

Nickel and Monel

Pure nickel clippings..... 52-54
Clean nickel turnings..... 37-40
Nickel anodes..... 52-54
Nickel rod ends..... 30-32
New Monel clippings..... 30-32
Clean Monel turnings..... 26-28
Old sheet Monel..... 18
Nickel silver clippings, mixed..... 15
Nickel silver turnings, mixed..... 15

Lead

Soft scrap lead..... 6 1/2 —6 3/4
Battery plates (dry)..... 2 —2 1/4
Batteries, acid free,..... 1 1/4 —2

Miscellaneous

Block tin..... 77 —78
No. 1 pewter..... 59 —60
Auto babbitt..... 40 —41
Mixer common babbitt..... 9 1/2 —10
Solder joints..... 13 1/4 —13 3/4
Siphon tops..... 42 —45
Small foundry type..... 9 1/2 —10
Monotype..... 9 1/2 —10
Lino. and stereotype..... 7 —9
Electrotype..... 5 1/4 —5 1/2
Hand picked type shells..... 2 1/4 —2 1/2
Lino. and stereo. dross..... 2 1/4 —2 3/4
Electro dross..... 2 1/4 —2 3/4

IRON AGE

Italics identify producers listed in key at end of table. Base prices, f.o.b. mill, in cents per lb., unless otherwise noted. Extras apply.

STEEL
PRICES

	BILLETS, BLOOMS, SLABS			PIL- ING	SHAPES STRUCTURALS			STRIP					
	Carbon Re-rolling Net Ton	Carbon Forging Net Ton	Alloy Net Ton		Carbon	Hi Str. Low Alloy	Carbon Wide- Flange	Hot- rolled	Cold- rolled	Hi Str. H.R. Low Alloy	Hi Str. C.R. Low Alloy	Alloy Hot- rolled	Alloy Cold- rolled
EAST	Bethlehem, Pa.		\$119.00 B3		5.55 B3	8.10 B3	5.55 B5						
	Buffalo, N. Y.	\$80.00 R3, B3	\$99.50 R3, B3	\$119.00 R3, B3	6.50 B3	5.55 B3	8.10 B3	5.55 B3	5.10 B3, R3	7.425 S10, R7	7.575 B3		
	Phila., Pa.								7.875 P15				
	Harrison, N. J.												15.55 C11
	Conschocken, Pa.		\$104.50 A2	\$126.00 A2				5.15 A2		7.575 A2			
	New Bedford, Mass.								7.875 R6				
	Johnstown, Pa.	\$80.00 B3	\$99.50 B3	\$119.00 B3		5.55 B3	8.10 B3						
	Boston, Mass.								7.975 T8				
	New Haven, Conn.								7.875 D1				
	Baltimore, Md.								7.425 T8				15.90 T8
	Phoenixville, Pa.				5.55 P2		5.55 P2						
MIDDLE WEST	Sparrows Pt., Md.							5.10 B3		7.575 B3			
	New Britain, Bridgeport, Wallingford, Conn.		\$119.00 N8						7.875 W1, S7				
	Pawtucket, R. I. Worcester, Mass.								7.975 N7, A5				15.90 N7 15.70 T8
	Alton, Ill.							5.30 L1					
	Ashland, Ky.							5.10 A7		7.575 A7			
	Canton-Massillon, Dover, Ohio		\$102.00 R3	\$119.00 R3, \$114.00 T5					7.425 G4		10.80 G4		
	Chicago, Franklin Park, Evanston, Ill.	\$80.00 U1, R3	\$99.50 U1, R3, W8	\$119.00 U1, R3, W8	6.50 U1	5.50 U1, W8, P13	8.05 U1, Y1, W8	5.50 U1	5.10 W8, N4, A1	7.525 A1, T8, M8	7.575 W8	8.40 W8, S9, I3	15.55 A1, S9, G4, T8
	Cleveland, Ohio								7.425 A5, J3		10.75 A5	8.40 J3	
	Detroit, Mich.			\$119.00 R5				5.10 G3, M2	7.425 M2, S1, D1, P11	7.575 G3	10.80 S1		
	Anderson, Ind.								7.425 G4				
	Gary, Ind. Harbor, Indiana	\$80.00 U1	\$99.50 U1	\$119.00 U1, Y1		5.50 U1, I3	8.05 U1, J3	5.50 I3	5.10 U1, I3, Y1	7.425 Y1	7.575 U1, I3, Y1	10.90 Y1	8.40 U1, Y1
WEST	Sterling, Ill.	\$80.00 N4				5.50 N4	7.75 N4	5.50 N4	5.20 N4				
	Indianapolis, Ind.									7.575 R5			15.70 R5
	Newport, Ky.							5.10 A9				8.40 A9	
	Niles, Warren, Ohio Sharon, Pa.		\$99.50 S1, C10	\$119.00 C10, S1				5.10 R3, S1	7.425 R3, T4, S1	7.575 R3, S1	10.80 R3, S1	8.40 S1	15.55 S1
	Owensboro, Ky.	\$80.00 G5	\$99.50 G5	\$119.00 G5									
	Pittsburgh, Midland, Butler, Aliquippa, McKeesport, Pa.	\$80.00 U1, P6	\$99.50 U1, C11, P6	\$119.00 U1, C11, B7	6.50 U1	5.50 U1, J3	8.05 U1, J3	5.50 U1	5.10 P6	7.425 J3, B4 7.525 E3		8.40 S9	15.55 S9
	Weirton, Wheeling, Follansbee, W. Va.				6.50 U1, W3	5.50 W3		5.50 W3	5.10 W3	7.425 F3	7.575 W3	10.80 W3	
	Youngstown, Ohio	\$80.00 R3	\$99.50 Y1, C10	\$119.00 Y1			8.05 Y1		5.10 U	7.425 Y1, R5	7.575 U1, Y1	10.95 Y1	8.40 U1, Y1
	Fontana, Cal.	\$80.50 K1	\$109.00 K1	\$140.00 K1		6.30 K1	8.85 K1	6.45 K1	5.825 K1	9.20 K1			
	Geneva, Utah		\$99.50 C7			5.50 C7	8.05 C7						
	Kansas City, Mo.					5.40 S2	8.15 S2					8.65 S2	
SOUTH	Los Angeles, Torrance, Cal.		\$109.00 B2	\$139.00 B2		6.20 C7, B2	8.75 B2		5.85 C7, B2	9.30 C1, R5		9.60 B2	17.75 J3
	Minneapolis, Colo.					5.80 C6			6.20 C6	9.375 C6			
	Portland, Ore.					6.25 O2							
	San Francisco, Niles, Pittsburg, Cal.		\$109.00 B2			6.15 B2	8.70 B2		5.85 C7, B2				
	Seattle, Wash.		\$113.00 B2			6.25 B2	8.80 B2		6.10 B2				
	Atlanta, Ga.					5.70 A8			5.10 A8				
	Fairfield, Ala. City, Birmingham, Ala.	\$80.00 T2	\$99.50 T2			5.50 T2 R3, C16	8.05 T2		5.10 T2, R3, C16		7.575 T2		
	Houston, Lone Star, Texas		\$104.50 S2	\$124.00 S2		5.60 S2	8.15 S2					8.65 S2	

(Effective April 13, 1959)

IRON AGE

Italics identify producers listed in key at end of table. Base prices, f.o.b. mill, in cents per lb., unless otherwise noted. Extras apply.

STEEL
PRICES

	SHEETS								WIRE ROD	TINPLATE†		Holloware Enameling 29 ga.
	Hot-rolled 18 ga. & hvyr.	Cold- rolled	Galvanized (Hot-dipped)	Enamel- ing	Long Terne	Hi Str. Low Alloy H.R.	Hi Str. Low Alloy C.R.	Hi Str. Low Alloy Galv.		Coke* 1.25-lb. base box	Electro** 0.25-lb. base box	
EAST	Buffalo, N. Y.	5.10 B3	6.275 B3			7.525 B3	9.275 B3		6.40 W6	† Special coated mfg. terne deduct 35¢ from 1.25-lb. coke base box price, 0.75 lb./0.25 lb. add 55¢. Can-making quality BLACKPLATE 55 to 128 lb. deduct \$2.20 from 1.25 lb. coke base box. * COKE: 1.50-lb. add 25¢. **ELECTRO: 0.50-lb. add 25¢; 0.75-lb. add 65¢; 1.00-lb. add \$1.00. Differential 1.00 lb./0.25 lb. add 65¢.		
	Claymont, Del.											
	Coatesville, Pa.											
	Conschocken, Pa.	5.15 A2	6.325 A2			7.575 A2						
	Harrisburg, Pa.											
	Hartford, Conn.											
	Johnstown, Pa.								6.40 B3			
	Fairless, Pa.	5.15 U1	6.325 U1			7.575 U1	9.325 U1			\$10.50 U1	\$9.20 U1	
	New Haven, Conn.											
	Phoenixville, Pa.											
MIDDLE WEST	Sparrows Pt., Md.	5.10 B3	6.275 B3	6.875 B3		7.525 B3	9.275 B3	10.025 B3	6.50 B3	\$10.40 B3	\$9.10 B3	
	Worcester, Mass.								6.70 A5			
	Trenton, N. J.											
	Alton, Ill.								6.50 L1			
	Ashland, Ky.	5.10 A7		6.875 A7	6.775 A7	7.525 A7						
	Canton-Massillon, Dover, Ohio			6.875 R1, R3								
	Chicago, Joliet, Ill.	5.10 W8, A1				7.525 U1, W8			6.40 A5, R3, W8			
	Sterling, Ill.								6.50 N4, K2			
	Cleveland, Ohio	5.10 R3, J3	6.275 R3, J3	7.65 R3*	6.775 R3	7.525 R3, J3	9.275 R3, J3		6.40 A5			
	Detroit, Mich.	5.10 G3, M2	6.275 G3, M2			7.525 G3	9.275 G3					
WEST	Newport, Ky.	5.10 A1	6.275 A1									
	Gary, Ind. Harbor, Indiana	5.10 U1, I3, Y1	6.275 U1, I3, Y1	6.875 U1, I3	6.775 U1, I3, Y1	7.225 U1	7.525 U1, Y1, I3	9.275 U1, Y1	6.40 Y1	\$10.40 U1, Y1	\$9.10 I3, U1, Y1	7.85 U1, Y1
	Granite City, Ill.	5.20 G2	6.375 G2	6.975 G2	6.875 G2						\$9.20 G2	7.95 G2
	Kokomo, Ind.			6.975 C9					6.50 C9			
	Manassas, Ohio	5.10 E2	6.275 E2			7.225 E2						
	Middletown, Ohio		6.275 A7	6.875 A7	6.775 A7	7.225 A7						
	Niles, Warren, Ohio Sharon, Pa.	5.10 R3, S1	6.275 R3	6.875 R3 7.65 R3*	6.775 S1	7.225 S1*, R3	7.525 R3, S1	9.275 R3,			\$9.10 R3	
	Pittsburgh, Midland, Butler, Donora, Aliquippa, McKeesport, Pa.	5.10 U1, J3, P6	6.275 U1, J3, P6	6.875 U1, J3 7.50 E3*	6.775 U1	7.525 U1, J3	9.275 U1, J3	10.025 U1, J3	6.40 A5, J3, P6	\$10.40 W5, J3	\$9.10 U1, J3	7.85 U1, J3
	Portsmouth, Ohio	5.10 P7	6.275 P7						6.40 P7			
	Weirton, Wheeling, Follansbee, W. Va.	5.10 W3, W5	6.275 W3, F3, W5	6.875 W3, W5 7.50 W3*		7.225 W3, W5	7.525 W3	9.275 W3		\$10.40 W5, W3	\$9.10 W5, W3	7.85 W5
SOUTH	Youngstown, Ohio	5.10 U1, Y1	6.275 Y1	7.50 J3*	6.775 Y1	7.525 Y1	9.275 Y1		6.40 Y1			
	Fontana, Cal.	5.825 K1	7.40 K1			8.25 K1	10.40 K1			\$11.05 K1	\$9.75 K1	
	Geneva, Utah	5.20 C7										
	Kansas City, Mo.								6.65 S2			
	Los Angeles, Torrance, Cal.								7.20 B2			
	Minneapolis, Colo.								6.65 C6			
	San Francisco, Niles, Pittsburg, Cal.	5.80 C7	7.225 C7	7.625 C7					7.20 C7	\$11.05 C7	\$9.75 C7	
	Atlanta, Ga.											
	Fairfield, Ala. Alabama City, Ala.	5.10 T2, R3	6.275 T2, R3	6.875 T2, R3	6.775 T2				6.40 T2, R3	\$10.50 T2	\$9.20 T2	
	Houston, Texas								6.65 S2			

* Electrogalvanized sheets.

(Effective April 13, 1959)

*7.425 at Sharon-Niles in 7.325

IRON AGE

STEEL
PRICES

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	BARS						PLATES				WIRE
	Carbon† Steel	Reinforc- ing	Cold Finished	Alloy Hot- rolled	Alloy Cold Drawn	Hi Str. H.R. Low Alloy	Carbon Steel	Floor Plate	Alloy	Hi Str. Low Alloy	Mfr's. Bright
EAST	Bethlehem, Pa.			6.725 B3	9.025 B3	8.30 B3					
	Buffalo, N. Y.	5.675 R3,B3	5.675 R3,B3	7.70 B5	6.725 B3,R3	9.025 B3,B5	5.30 B3				8.00 W6
	Claymont, Del.						5.30 C4		7.50 C4	7.95 C4	
	Coatesville, Pa.						5.30 L4		7.50 L4	7.95 L4	
	Conshohocken, Pa.						5.30 A2	6.375 A2	7.50 A2	7.95 A2	
	Harrisburg, Pa.						5.30 P2	6.375 P2			
	Milton, Pa.	5.825 M7	5.825 M7								
	Hartford, Conn.			8.15 R3		9.325 R3					
	Johnstown, Pa.	5.675 B3	5.675 B3		6.725 B3	8.30 B3	5.30 B3		7.50 B3	7.95 B3	8.00 B3
	Fairless, Pa.	5.825 U1	5.825 U1		6.875 U1						
	Newark, Camden, N. J.			8.10 W10, P10		9.20 W10, P10					
	Bridgeport, Putnam, Willimantic, Conn.			8.20 W10 8.15 J3	6.80 N8	9.175 N8					
	Sparrows Pt., Md.		5.675 B3				5.30 B3		7.50 B3	7.95 B3	8.10 B3
	Palmer, Worcester, Readville, Mansfield, Mass.			8.20 B5, C14		9.325 A5,B5					8.30 A5, W6
	Spring City, Pa.			8.10 K4		9.20 K4					
MIDDLE WEST	Alton, Ill.	5.875 L1									8.20 L1
	Ashland, Newport, Ky.						5.30 A7,A9		7.50 A9	7.95 A7	
	Canton, Massillon, Mansfield, Ohio	6.15* R3		7.65 R3,R2	6.725 R3 6.475 T5	9.025 R3,R2 8.775 T5	5.30 E2				
	Chicago, Joliet, Waukegan, Madison, Harvey, Ill.	5.675 U1,R3, W8,N4,P13	5.675 U1,R3, N4,P13,W8 5.875 L1	7.65 A5, W10,W8, B5,L2,N9	6.725 U1,R3, W8	9.025 A5, W10,W8, L2,N8,B5	5.30 U1,A1, W8,I3	6.375 U1	7.50 U1, W8	7.95 U1, W8	8.00 A5,R3, W8,N4, K2,W7
	Cleveland, Elyria, Ohio	5.675 R3	5.675 R3	7.65 A5,C13, C18		9.025 A5, C13,C18	5.30 R3,J3	6.375 J3		7.95 R3,J3	8.00 A5, C13,C18
	Detroit, Mich.	5.675 G3	5.675 G3	7.90 P3 7.85 P8,B5 7.65 R5	6.725 R5,G3	9.025 R5 9.225 B5,P3, P8	5.30 G3		7.50 G3	7.95 G3	
	Duluth, Minn.										8.00 A5
	Gary, Ind. Harbor, Crawfordsville, Hammond, Ind.	5.675 U1,I3, Y1	5.675 U1,I3, Y1	7.65 R3,J3	6.725 U1,I3, Y1	9.025 R3,M4	5.30 U1,I3, Y1	6.375 J3, I1	7.50 U1, Y1	7.95 U1, Y1,I3	8.10 M4
	Granite City, Ill.						5.40 G2				
	Kokomo, Ind.		5.775 C9								8.10 C9
	Sterling, Ill.	5.775 N4	5.775 N4				5.30 N4				8.10 K2
	Niles, Warren, Ohio Sharon, Pa.			7.65 C10	6.725 C10	9.025 C10	5.30 R3,S1		7.50 S1	7.95 R3, S1	
	Owensboro, Ky.	5.675 G5			6.725 G5						
	Pittsburgh, Midland, Donora, Aliquippa, Pa.	5.675 U1,J3	5.675 U1,J3	7.65 A5,B4, R3,J3,C11, W10,S9,C8, M9	6.725 U1,J3, C11,B7	9.025 A5, W10,R3,S9, C11,C8,M9	5.30 U1,J3	6.375 U1,J3	7.50 U1, J3,B7	7.95 U1, J3,B7	8.00 A5, J3,P6
	Portsmouth, Ohio										8.00 P7
WEST	Weirton, Wheeling, Follansbee, W. Va.						5.30 W5				
	Youngstown, Ohio	5.675 U1,R3, Y1	5.675 U1,R3, Y1	7.65 A1,Y1, F2	6.725 U1,Y1	9.025 Y1,F2	5.30 U1,Y1 5.30 U1, R3,Y1		7.50 Y1	7.95 U1,Y1	8.00 Y1
	Emeryville, Fontana, Cal.	6.425 J5 6.375 K1	6.425 J5 6.375 K1		7.775 K1	9.00 K1	6.10 K1		8.30 K1	8.75 K1	
	Geneva, Utah						5.30 C7			7.95 C7	
	Kansas City, Mo.	5.925 S2	5.925 S2		6.975 S2	8.55 S2					8.25 S2
	Los Angeles, Torrance, Cal.	6.375 C7,B2	6.375 C7,B2	9.10 R3,P14, S12	7.775 B2	11.00 P14, S12					8.95 B2
	Minnequa, Colo.	6.125 C6	6.125 C6				6.15 C6				8.25 C6
	Portland, Ore.	6.425 O2	6.425 O2								
	San Francisco, Niles, Pittsburg, Cal.	6.375 C7 6.425 B2	6.375 C7 6.425 B2			8.675 B2					8.95 C7,C6
	Seattle, Wash.	6.425 B2,N6	6.425 B2			8.675 B2	6.20 B2		8.40 B2	8.85 B2	
SOUTH	Atlanta, Ga.	5.875 A8	5.675 A8								8.00 A8
	Fairfield City, Ala. Birmingham, Ala.	5.675 T2,R3, C16	5.675 T2,R3, C16	8.25 C16		8.30 T2	5.30 T2,R3			7.95 T2	8.00 T2,R3
	Houston, Ft. Worth, Lone Star, Texas	5.925 S2	5.925 S2		6.975 S2	8.55 S2	5.40 S2		7.60 S2	8.05 S2	8.25 S2

† Merchant Quality—Special Quality 35¢ higher.

(Effective April 13, 1959)

* Special Quality.

STEEL PRICES

Key to Steel Producers

With Principal Offices

A1	Acme Steel Co., Chicago
A2	Alan Wood Steel Co., Conshohocken, Pa.
A3	Allegheny Ludlum Steel Corp., Pittsburgh
A4	American Cladmetals Co., Carnegie, Pa.
A5	American Steel & Wire Div., Cleveland
A6	Angel Nail & Chaplet Co., Cleveland
A7	Armco Steel Corp., Middletown, Ohio
A8	Atlantic Steel Co., Atlanta, Ga.
A9	Acme-Newport Steel Co., Newport, Ky.
B1	Babcock & Wilcox Tube Div., Beaver Falls, Pa.
B2	Bethlehem Pacific Coast Steel Corp., San Francisco
B3	Bethlehem Steel Co., Bethlehem, Pa.
B4	Blair Strip Steel Co., New Castle, Pa.
B5	Bliss & Laughlin, Inc., Harvey, Ill.
B6	Brook Plant, Wickwire-Spencer Steel Div., Birdsboro, Pa.
B7	A. M. Byers, Pittsburgh
B8	Braeburn Alloy Steel Corp., Braeburn, Pa.
C1	Calstrip Steel Corp., Los Angeles
C2	Carpenter Steel Co., Reading, Pa.
C3	Claymont Products Dept., Claymont, Del.
C6	Colorado Fuel & Iron Corp., Denver
C7	Columbia Geneva Steel Div., San Francisco
C8	Columbia Steel & Shifting Co., Pittsburgh
C9	Continental Steel Corp., Kokomo, Ind.
C10	Copperweld Steel Co., Pittsburgh, Pa.
C11	Crucible Steel Co. of America, Pittsburgh
C13	Cuyahoga Steel & Wire Co., Cleveland
C14	Compressed Steel Shifting Co., Readville, Mass.
C15	G. O. Carlson, Inc., Thorndale, Pa.
C16	Connors Steel Div., Birmingham
C18	Cold Drawn Steel Plant, Western Automatic Machine Screw Co., Elyria, O.
D1	Detroit Steel Corp., Detroit
D2	Driver, Wilbur B. Co., Newark, N. J.
D3	Driver Harris Co., Harrison, N. J.
D4	Dickson Weatherproof Nail Co., Evanston, Ill.
E1	Eastern Stainless Steel Corp., Baltimore
E2	Empire-Reeves Steel Corp., Mansfield, O.
E3	Enamel Products & Plating Co., McKeesport, Pa.
F1	Firth Sterling, Inc., McKeesport, Pa.
F2	Fitzsimons Steel Corp., Youngstown
F3	Follansbee Steel Corp., Follansbee, W. Va.

G2	Granite City Steel Co., Granite City, Ill.
G3	Great Lakes Steel Corp., Detroit
G4	Greer Steel Co., Dover, O.
G5	Green River Steel Corp., Owenboro, Ky.
H1	Hanna Furnace Corp., Detroit
I2	Ingersoll Steel Div., Chicago
I3	Inland Steel Co., Chicago
I4	Interlake Iron Corp., Cleveland
J1	Jackson Iron & Steel Co., Jackson, O.
J2	Jessop Steel Corp., Washington, Pa.
J3	Jones & Laughlin Steel Corp., Pittsburgh
J4	Joslyn Mfg. & Supply Co., Chicago
J5	Judson Steel Corp., Emeryville, Calif.
K1	Kaiser Steel Corp., Fontana, Calif.
K2	Keystone Steel & Wire Co., Peoria
K3	Koppers Co., Granite City, Ill.
K4	Keystone Drawn Steel Co., Spring City, Pa.
L1	Laclede Steel Co., St. Louis
L2	La Salle Steel Co., Chicago
L3	Lone Star Steel Co., Dallas
L4	Lukens Steel Co., Coatesville, Pa.
M1	Mahoning Valley Steel Co., Niles, O.
M2	McLouth Steel Corp., Detroit
M3	Mercer Tube & Mfg. Co., Sharon, Pa.
M4	Mid States Steel & Wire Co., Crawfordsville, Ind.
M6	Mystic Iron Works, Everett, Mass.
M7	Milton Steel Products Div., Milton, Pa.
M8	Mill Strip Products Co., Evanston, Ill.
M9	Moltrup Steel Products Co., Beaver Falls, Pa.
N1	National Supply Co., Pittsburgh
N2	National Tube Div., Pittsburgh
N4	Northwestern Steel & Wire Co., Sterling, Ill.
N6	Northwest Steel Rolling Mills, Seattle
N7	Newman Crosby Steel Co., Pawtucket, R. I.
N8	Carpenter Steel of New England, Inc., Bridgeport, Conn.
N9	Nelson Steel & Wire Co.
O1	Oliver Iron & Steel Co., Pittsburgh
O2	Oregon Steel Mills, Portland
P1	Page Steel & Wire Div., Monaca, Pa.
P2	Phoenix Steel Corp., Phoenixville, Pa.
P3	Pilgrim Drawn Steel Div., Plymouth, Mich.
P4	Pittsburgh Coke & Chemical Co., Pittsburgh
P5	Pittsburgh Screw & Bolt Co., Pittsburgh
P6	Pittsburgh Steel Co., Pittsburgh
P7	Portsmouth Div., Detroit Steel Corp., Detroit
P8	Plymouth Steel Co., Detroit

P9	Pacific States Steel Co., Niles, Cal.
P10	Precision Drawn Steel Co., Camden, N. J.
P11	Production Steel Strip Corp., Detroit
P13	Phoenix Mfg. Co., Joliet, Ill.
P14	Pacific Tube Co.
P15	Philadelphia Steel and Wire Corp.
R2	Reliance Div., Eaton Mfg. Co., Miamillon, O.
R3	Republic Steel Corp., Cleveland
R4	Roebbing Sons Co., John A., Trenton, N. J.
R5	Jones & Laughlin Steel Corp., Stainless and Strip Div.
R6	Rodney Metals, Inc., New Bedford, Mass.
R7	Rome Strip Steel Co., Rome, N. Y.
S1	Sharon Steel Corp., Sharon, Pa.
S2	Sheffield Steel Div., Kansas City
S3	Shenango Furnace Co., Pittsburgh
S4	Simonds Saw and Steel Co., Fitchburg, Mass.
S5	Sweet's Steel Co., Williamsport, Pa.
S7	Stanley Works, New Britain, Conn.
S8	Superior Drawn Steel Co., Monaca, Pa.
S9	Superior Steel Div. of Copperweld Steel Co., Carnegie, Pa.
S10	Seneca Steel Service, Buffalo
S11	Southern Electric Steel Co., Birmingham
S12	Sierra Drawn Steel Corp., Los Angeles, Calif.
S13	Seymour Mfg. Co., Seymour, Conn.
T1	Tonawanda Iron Div., N. Tonawanda, N. Y.
T2	Tennessee Coal & Iron Div., Fairfield
T3	Tennessee Products & Chem. Corp., Nashville
T4	Thomas Strip Div., Warren, O.
T5	Timken Steel & Tube Div., Canton, O.
T7	Texas Steel Co., Fort Worth
T8	Thompson Wire Co., Boston
U1	United States Steel Corp., Pittsburgh
U2	Universal-Cyclops Steel Corp., Bridgeville, Pa.
U3	Ulrich Stainless Steels, Wallingford, Conn.
U4	U. S. Pipe & Foundry Co., Birmingham
W1	Wallingford Steel Co., Wallingford, Conn.
W2	Washington Steel Corp., Washington, Pa.
W3	Weirton Steel Co., Weirton, W. Va.
W4	Wheatland Tube Co., Wheatland, Pa.
W5	Wheeling Steel Corp., Wheeling, W. Va.
W6	Wickwire Spencer Steel Div., Buffalo
W7	Wilson Steel & Wire Co., Chicago
W8	Wisconsin Steel Div., S. Chicago, Ill.
W9	Woodward Iron Co., Woodward, Ala.
W10	Wyckoff Steel Co., Pittsburgh
W12	Wallace Barnes Steel Div., Bristol, Conn.
Y1	Youngstown Sheet & Tube Co., Youngstown, O.

PIPE AND TUBING

Base discounts (per) f.o.b. mills. Base price about \$200 per net ton.

STANDARD T. & C.	BUTTWELD														SEAMLESS								
	½ In.		¾ In.		1 In.		1¼ In.		1½ In.		2 In.		2½-3 In.		2 In.		2½ In.		3 In.		3½-4 In.		
	Blk.	Gal.	Blk.	Gal.	Blk.	Gal.	Blk.	Gal.	Blk.	Gal.	Blk.	Gal.	Blk.	Gal.	Blk.	Gal.	Blk.	Gal.	Blk.	Gal.	Blk.	Gal.	
Sparrows Pt. B3.....	0.25	*15.0	3.25	*11.0	6.75	*6.50	9.25	*5.75	9.75	*4.75	10.25	*4.25	11.75	*4.50									
Youngstown R3.....	2.25	*13.0	5.25	*9.0	8.75	*4.50	11.25	*3.75	11.75	*2.75	12.25	*2.25	13.75	*2.50									
Fontana K1.....	*10.75	*26.00	*7.75	*22.00	*4.25	*17.50	*1.75	*16.75	*1.25	*15.75	*0.75	*15.25	0.75	*15.50									
Pittsburgh J3.....	2.25	*13.0	5.25	*9.0	8.75	*4.50	11.25	*3.75	11.75	*2.75	12.25	*2.25	13.75	*2.50	*12.25	*27.25	*5.75	*22.50	*3.25	*20.0	*1.75	*18.50	
Alton, Ill. L1.....	0.25	*15.0	3.25	*11.0	6.75	*6.50	9.25	*5.75	9.75	*4.75	10.25	*4.25	11.75	*4.50									
Sharon M3.....	2.25	*13.0	5.25	*9.0	8.75	*4.50	11.25	*3.75	11.75	*2.75	12.25	*2.25	13.75	*2.50									
Fairless N2.....	0.25	*15.0	3.25	*11.0	6.75	*6.50	9.25	*5.75	9.75	*4.75	10.25	*4.25	11.75	*4.50									
Pittsburgh N1.....	2.25	*13.0	5.25	*9.0	8.75	*4.50	11.25	*3.75	11.75	*2.75	12.25	*2.25	13.75	*2.50	*12.25	*27.25	*5.75	*22.50	*3.25	*20.0	*1.75	*18.50	
Wheeling W5.....	2.25	*13.0	5.25	*9.0	8.75	*4.50	11.25	*3.75	11.75	*2.75	12.25	*2.25	13.75	*2.50									
Wheatland W4.....	2.25	*13.0	5.25	*9.0	8.75	*4.50	11.25	*3.75	11.75	*2.75	12.25	*2.25	13.75	*2.50									
Youngstown Y1.....	2.25	*13.0	5.25	*9.0	8.75	*4.50	11.25	*3.75	11.75	*2.75	12.25	*2.25	13.75	*2.50	*12.25	*27.25	*5.75	*22.50	*3.25	*20.0	*1.75	*18.50	
Indiana Harbor Y1.....	1.25	*14.0	4.25	*10.0	7.75	*5.50	10.25	*4.75	10.75	*3.75	11.25	*3.25	12.75	*3.50									
Lorain N2.....	2.25	*13.0	5.25	*9.0	8.75	*4.50	11.25	*3.75	11.75	*2.75	12.25	*2.25	13.75	*2.50	*12.25	*27.25	*5.75	*22.50	*3.25	*20.0	*1.75	*18.50	
EXTRA STRONG PLAIN ENDS																							
Sparrows Pt. B3.....	4.75	*9.0	8.75	*5.0	11.75	*9.50	12.25	*1.75	12.75	*0.75	13.25	*0.25	13.75	*1.50									
Youngstown R3.....	6.75	*7.0	10.75	*3.0	13.75	1.50	14.25	0.25	14.75	1.25	15.25	1.75	15.75	0.50									
Fairless N2.....	4.75	*9.0	8.75	*5.0	11.75	*9.50	12.25	*1.75	12.75	*0.75	13.25	*0.25	13.75	*1.50									
Fontana K1.....	*6.25		*2.25		0.75		1.25		1.75		2.25		2.75		0.50	*10.75	*24.75	*3.25	*19.0	*0.75	*16.50	4.25	*11.50
Pittsburgh J3.....	6.75	*7.0	10.75	*3.0	13.75	1.50	14.25	0.25	14.75	1.25	15.25	1.75	15.75	0.50									
Alton, Ill. L1.....	4.75	*9.0	8.75	*5.0	11.75	*9.50	12.25	*1.75	12.75	*0.75	13.25	*0.25	13.75	*1.50									
Sharon M3.....	6.75	*7.0	10.75	*3.0	13.75	1.50	14.25	0.25	14.75	1.25	15.25	1.75	15.75	0.50									
Pittsburgh N1.....	6.75	*7.0	10.75	*3.0	13.75	1.50	14.25	0.25	14.75	1.25	15.25	1.75	15.75	0.50	*10.75	*24.75	*3.25	*19.0	*0.75	*16.50	4.25	*11.50	
Wheeling W5.....	6.75	*7.0	10.75	*3.0	13.75	1.50	14.25	0.25	14.75	1.25	15.25	1.75	15.75	0.50									
Wheatland W4.....	6.75	*7.0	10.75	*3.0	13.75	1.50	14.25	0.25	14.75	1.25	15.25	1.75	15.75	0.50									
Youngstown Y1.....	6.75	*7.0	10.75	*3.0	13.75	1.50	14.25	0.25	14.75	1.25	15.25	1.75	15.75	0.50	*10.75	*24.75	*3.25	*19.0	*0.75	*16.50	4.25	*11.50	
Indiana Harbor Y1.....	5.75	*8.0	9.75	*4.0	12.75	0.50	13.25	*0.75	13.75	0.25	14.25	0.75	14.75	0.50									
Lorain N2.....	6.75	*7.0	10.75	*3.0	13.75	1.50	14.25	0.25	14.75	1.25	15.25	1.75	15.75	0.50	*10.75	*24.75	*3.25	*19.0	*0.75	*16.50	4.25	*11.50	

Threads only, butt weld and seamless, 2 1/4 pt. higher discount. Plain ends, butt weld and seamless, 3-in. and under, 5 1/2 pt. higher discount. Galvanized discounts based on zinc price range of over 9¢ to 11¢ per lb. East St. Louis. For each 2¢ change in zinc, discounts vary as follows: 1/2, 3/4 and 1-in., 2 pt.; 1 1/4, 1 1/2 and 2-in., 1 1/2 pt.; 2 1/2 and 3-in., 1 pt., e.g., zinc price range of over 13¢ to 15¢ would lower discounts on 2 1/2 and 3-in. pipe by 2 points; zinc price in range over 7¢ to 9¢ would increase discounts. East St. Louis zinc price now 11.00¢ per lb.

(Effective April 13, 1959)

TOOL STEEL

F.o.b. mill	W	Cr	V	Mo	Co	per lb	SAE
18	4	1	—	—	—	\$1.84	T-1
18	4	1	—	—	—	2.545	T-4
18	4	1	—	—	—	2.005	T-2
1.5	4	1.5	8	—	—	1.20	M-1
6	4	3	6	—	—	1.59	M-3
6	4	3	5	—	—	1.345	M-2
High-carbon chromium...							.955 D-3, D-5
Oil hardened manganese							.505 O-2
Special carbon							.38 W-1
Extra carbon							.38 W-1
Regular carbon							.325 W-1
Warehouse prices on and east of Mississippi are 4¢ per lb higher. West of Mississippi, 6¢ higher.							

CLAD STEEL

Base prices, cents per lb f.o.b.

Cladding	Plate (L4, C4, A3, J2)			Sheet (J2)
	10 pct	15 pct	20 pct	20 pct
302				37.50
304	28.80	31.55	34.30	40.00
316	42.20	46.25	50.25	58.75
321	34.50	37.75	41.05	47.25
347	40.80	44.65	48.55	57.00
405	24.60	26.90	29.25	.....
410	22.70	24.85	27.00	.....
430	23.45	25.65	27.90	.....

CR Strip (S9) Copper, 10 pct, 2 sides, 43.15; 1 side, 36.20.

RAILS, TRACK SUPPLIES

F.o.b. Mill Cents Per Lb	No. 1 Std. Rails	Light Rails	Joint Bars	Track Spikes	Tie Plates	Track Bolts Untreated
Bessemer U1	5.75	6.725	7.25			
Cleveland R3						15.35
So. Chicago R3				10.10		
Ensley T2	5.75	6.725				
Fairfield T2		6.725		10.10	6.875	
Gary U1	5.75				6.875	
Ind. Harbor J3				10.10		
Johnstown B3		6.725				
Joliet U1			7.25			
Kansas City S2				10.10		15.35
Lackawanna B3	5.75	6.725	7.25		6.875	
Lebanon B3			7.25			15.35
Minneapolis C6	5.75	7.225	7.25	10.10	6.875	15.35
Pittsburgh P5						14.75
Pittsburgh J3				10.10		
Seattle B2					6.75	15.85
Steelton B3	5.75		7.25		6.875	
Struthers Y1				10.10		
Torrance C7					6.75	
Williamsport S5		6.725				
Youngstown R3				10.10		

COKE

Furnace, beehive (f.o.b.)	Net-Ton
Connellsville, Pa.	\$14.50 to \$15.50
Foundry, beehive (f.o.b.)	\$18.50
Foundry oven coke	
Buffalo, del'd	\$33.25
Detroit f.o.b.	32.00
New England, del'd	33.55
New Haven, f.o.b.	31.00
Kearney, N. J., f.o.b.	31.25
Philadelphia, f.o.b.	31.00
Swedeland, Pa., f.o.b.	31.00
Painesville, Ohio, f.o.b.	34.35
Erie, Pa., f.o.b.	32.00
Cleveland, del'd	34.19
Cincinnati, del'd	32.84
St. Paul, f.o.b.	31.25
St. Louis, f.o.b.	33.00
Birmingham, f.o.b.	30.35
Milwaukee, f.o.b.	32.00
Neville Is., Pa.	30.75

LAKE SUPERIOR ORES

51.50% Fe natural content, delivered lower Lake ports. Prices for 1959 season. Freight changes for seller's account.	
Gross Ton	
Openhearth lump	\$12.70
Old range, bessemer	11.85
Old range, nonbessemer	11.70
Mesabi, bessemer	11.60
Mesabi, nonbessemer	11.45
High phosphorus	11.45

ELECTRICAL SHEETS

22-Gage F.o.b. Mill Cents Per Lb	Hot-Rolled (Cut Lengths)*	Cold-Reduced (Coiled or Cut Length)	
		Semi-Processed	Fully Processed
Field		9.875	
Armature	11.70	11.20	11.70
Elect.	12.40	11.90	12.40
Special Motor		12.475	
Motor	13.55	13.05	13.55
Dynamo	14.65	14.15	14.65
Trans. 72	15.70	15.20	15.70
Trans. 65	16.30		
Grain Oriented			
Trans. 58	16.80	Trans. 80	19.70
Trans. 52	17.85	Trans. 73	20.20
		Trans. 66	20.70

Producing points: Aliquippa (J3); Beech Bottom (W5); Brackenridge (A3); Granite City (G2); Indiana Harbor (J3); Mansfield (E2); Newport, Ky. (A9); Niles, O. (S1); Vandergrift (U1); Warren, O. (R3); Zanesville, Butler (A7).

ELECTRODES

Cents per lb. f.o.b. plant, threaded, with nipples, unboxed.

GRAPHITE			CARBON*		
Diam. (in.)	Length (in.)	Price	Diam. (in.)	Length (in.)	Price
24	84	27.25	40	100, 110	12.50
20	72	26.50	35	110	11.20
18	72	27.50	30	110	11.70
14	72	27.25	24	72	11.95
12	72	28.25	20	90	11.55
10	60	29.50	17	72	12.10
10	48	30.00	14	72	12.55
7	60	29.75	10	60	13.80
6	60	33.25	8	60	14.25
4	40	37.00			
3	40	39.25			
2 1/2	30	41.50			
2	24	64.00			

* Prices shown cover carbon nipples.

REFRACTORIES

Fire Clay Brick

Super duty, Mo., Pa., Md., Ky....	Carloads per 1000
High duty (except Salina, Pa., add \$3.00)	\$185.00
Medium duty	140.00
Low duty (except Salina, Pa., add \$2.00)	125.00
Ground fire clay, net ton, bulk...	103.00
	22.50

Silica Brick

Mt. Union, Pa., Ensley, Ala.	\$158.00
Childs, Hays, Latrobe, Pa.	163.00
Chicago District	168.00
Western Utah	183.00
California	165.00
Super Duty	
Hays, Pa., Athens, Tex., Windham, Warren, O., Morrisville	163.00
Silica cement, net ton, bulk, Latrobe	29.75
Silica cement, net ton, bulk, Chicago	26.75
Silica cement, net ton, bulk, Ensley, Ala.	27.75
Silica cement, net ton, bulk, Mt. Union	25.75
Silica cement, net ton, bulk, Utah and Calif.	39.00

Chrome Brick

Standard chemically bonded, Balt.	\$109.00
Standard chemically bonded, Cincinnati, Calif.	119.00
Burned, Balt.	103.00

Magnesite Brick

Standard, Baltimore	\$140.00
Chemically bonded, Baltimore	119.00

Grain Magnesite

St. % to 1/2-in. grains	
Domestic, f.o.b. Baltimore in bulk	\$73.00
Domestic, f.o.b. Chewah, Wash., Luning, Nev.	
in bulk	46.00
in sacks	52.00-54.00

Dead Burned Dolomite

Per net ton	
F.o.b. bulk, producing points in: Pa., W. Va., Ohio	\$16.75
Missouri Valley	15.60
Midwest	17.00

(Effective April 13, 1959)

MERCHANT WIRE PRODUCTS

F.o.b. Mill	Standard Q Coated Nails		Woven Wire Fence		1/2" Fence Posts		Single Loop Bale Tie		Galv. Barbed and Twisted Barbed Wire		Merch. Wire Am'td		Merch. Wire Galv.	
	Cal	Cal	Cal	Cal	Cal	Cal	Cal	Cal	Cal	Cal	Cal	Cal	Cal	Cal
Alabama City R3	173	187			212	193			9.00	9.55				
Aliquippa J3***	173	190			190				9.00	9.675				
Atlanta A8**	175	192			214	198			8.75	9.425				
Bartonsville K2**	175	192			178	214			9.10	9.775				
Buffalo W6									9.00	9.55*				
Chicago N4**	177	190			172	212			9.00	9.70				
Cleveland A6									9.00	9.55				
Crawf'v. M4**	175	192			214	198			9.10	9.775				
Donora, Pa. A5	173	187			212	193			9.00	9.55				
Duluth A5	173	187			212	193			9.00	9.55				
Fairfield, Ala. T2	173	187			212	193			9.00	9.55				
Galveston D4	9.101													
Houston S2	175	192			217	198			9.25	9.801				
Jacksonville M4	184-1				219	203			9.10	9.775				
Johnstown B3**	173	190	171		196				9.00	9.675				
Joliet, Ill. A5	173	187			212	193			9.00	9.55				
Kokomo C9	175	189			214	195*			9.10	9.65*				
L. Angeles B2**									9.95	10.625				
Kansas City S2*	178	192			217	198*			9.25	9.801				
Minneapolis C6	178	192			182	217			9.25	9.801				
Minneapolis P6									9.30	9.85				
Palmer, Mass. W6									9.30	9.85				
Pittsburg, Cal. C7	192	210			213				9.00	10.15				
Rankin, Pa. A5	173	187			193				9.00	9.55				
So. Chicago R3	173	187			193				8.65	9.20				
S. San Fran. C6					236				9.95	10.50†				
Sparrows Pt. B3**	175				214	198			9.10	9.775				
Struthers, O. Y1*									8.65	9.20				
Worcester A5	179								9.30	9.85				
Williamsport S5														

* Zinc less than .10%. ** .10% zinc. *** 11-12% zinc. † Plus zinc extras. ‡ Wholesalers only.

C-R SPRING STEEL

Cents Per Lb F.o.b. Mill	CARBON CONTENT				
	0.26-0.40	0.41-0.60	0.61-0.80	0.81-1.05	1.06-1.35
Anderson, Ind. G4	8.95	10.40	12.60	15.60	18.55
Baltimore, Md. T8	9.50	10.70	12.90	15.90	18.85
Bristol, Conn. W12		10.70	12.90	16.10	19.30
Boston T8	9.50	10.70	12.90	15.90	18.85
Buffalo, N. Y. R7	8.95	10.40	12.60	15.60	18.55
Carnegie, Pa. S9	8.95	10.40	12.60	15.60	18.55
Cleveland A5	8.95	10.40	12.60	15.60	18.55
Dearborn S1	9.05	10.50	12.70		
Detroit D1	9.05	10.50	12.70	15.70	
Detroit D2	9.05	10.50	12.70		
Dever, O. G4	8.95	10.40	12.60	15.60	18.55
Evansville, Ill. M8	9.05	10.40	12.60		
Franklin Park, Ill. T8	9.05	10.40	12.60	15.60	18.55
Harrison, N. J. C11			12.90	16.10	19.30
Indianapolis R5	9.10	10.55	12.60	15.60	18.55
Los Angeles C1	11.15	12.60	14.80	17.80	
New Britain, Conn. S7	9.40	10.70	12.90	15.90	18.85
New Castle, Pa. B4	8.95	10.40	12.60	15.60	
New Haven, Conn. D1	9.40	10.70	12.90	15.90	
Pawtucket, R. I. N7	9.50	10.70	12.90	15.90	18.85
Riverdale, Ill. A1	9.05	10.40	12.60	15.60	18.55
Sharon, Pa. S1	8.95	10.40	12.60	15.60	18.55
Trenton, R4		10.70	12.90	16.10	19.30
Wallingford W1	9.40	10.70	12.90	15.90	18.85
Warren, Ohio T4	8.95	10.40	12.60	15.60	18.75
Worcester, Mass. A5	9.50	10.70	12.90	15.90	18.85
Youngstown R5	9.10	10.55	12.60	15.60	18.55

BOILER TUBES

\$ per 100 ft. carload lots cut 10 to 24 ft. F.o.b. Mill	Size		Seamless		Elec. Weld
	OD-In.	B.W.Gs.	H.R.	C.D.	H.R.
Babcock & Wilcox...	2	13	48.28	47.21	35.22
	2½	12	54.23	63.57	47.43
	3	12	62.62	73.40	54.77
	3½	11	73.11	85.70	63.93
	4	10	97.08	113.80	85.53
National Tube.....	2	13	48.28	47.21	35.22
	2½	12	54.23	63.57	47.43
	3	12	62.62	73.40	54.77
	3½	11	73.11	85.70	63.93
	4	10	97.08	113.80	85.53
Pittsburgh Steel...	2	13	48.28	47.21	.....
	2½	12	54.23	63.57	.....
	3	12	62.62	73.40	.....
	3½	11	73.11	85.70	.....
	4	10	97.08	113.80	.....

METAL POWDERS

Cents per lb, minimum truckload, delivered E. of Miss. River, unless otherwise noted.

Iron Powders

Compacting Powders	
Electrolytic, imported, f.o.b.	29.50 to 33.00
Electrolytic, domestic	34.50
Sponge	11.25
Atomized	11.25
Hydrogen Reduced	11.25 to 12.00
Carbonyl	88.00
Welding Powders*	8.10
Cutting and Scarfing Powders*	9.10

Copper Powders

Electrolytic, domestic	41.00
Precipitated	40.50 to 45.00
Atomized	39.80 to 43.30
Hydrogen reduced, f.o.b.	43.25
Bronze	47.20 to 51.50
Chromium, electrolytic	55.00
Lead	19.00
Manganese, f.o.b.	42.00
Molybdenum	\$3.60 to \$3.95
Nickel	\$1.05 to \$1.03
Nickel Silver	53.50
Nickel Steel	13.00
Solder	13¢ plus metal value
Stainless Steel, 302	\$1.07
Stainless Steel, 316	\$1.26
Steel, atomized, prealloyed, 4600 series	14.00 plus metal value
Tin	14¢ plus metal value
Titanium, 99.25+%, per lb., f.o.b.	\$11.25
Tungsten	\$3.15 (nominal)

* F.O.B., shipping point.

BOLTS, NUTS, RIVETS, SCREWS

(Base discount, f.o.b. mill) Pct. Discounts

Bolts	1-4 Containers	5 Containers	20,000 Lb.	40,000 Lb.
Machine				
1/2" and smaller x 3" and shorter	55	57	61	62
3/4" diam. x 3" and shorter	47	49 1/2	54	55
1/2" thru 1" diam x 6" and shorter	37	39 1/2	45	46
1/2" thru 1" diam. longer than 6" and 1 1/2" and larger x all lengths	31	34	40	41
Roll thread, 1/2" and smaller x 3" and shorter	55	57	61	62
Carriage, lag, plow, tap, blank, step, elevator and fitting up bolts 1/2" and smaller x 6" and shorter	48	50 1/2	55	56

Note: Add 25 pct for less than container quantity. Distributor prices are 5 pct less on bolts and square nuts.

Nuts, Hex, HP reg. & hvy.	Full case or Keg price
1/2 in. or smaller	62
3/4 in. to 1 1/2 in. inclusive	56
1 1/2 in. and larger	51 1/2

C. P. Hex, reg. & hvy.

1/2 in. or smaller	62
3/4 in. to 1 1/2 in. inclusive	56
1 1/2 in. and larger	51 1/2

Hot Galv. Hex Nuts (All Types)

1/2 in. and smaller	41
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Semi-finished Hex Nuts

1/2 in. or smaller	62
3/4 in. to 1 1/2 in. inclusive	56
1 1/2 in. and larger	51 1/2
(Add 25 pct for broken case or keg quantities)	

Finished

1/2 in. and smaller	65
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Rivets

1/2 in. and larger	Base per 100 lb \$12.85
7/16 in. and smaller	Pct. Off List 15

Cap Screws

New std. hex head, packaged	Discount (Packages) Full Finished H. C. Heat Treated Full Case
-----------------------------	--

1/2" diam. and smaller x 6" and shorter	54	42
3/4" 1/2", and 1" diam. x 6" and shorter	38	28
1/2" diam. and smaller x longer than 6"	..	..
3/4" 1/2", and 1" diam. x longer than 6"	..	..
1/2" through 5/8" dia. x 6" and shorter	59	48
3/4" through 1" dia. x 6" and shorter	45	32
Minimum quantity—1/2" through 3/4" diam., 15,000 pieces; 7/16" through 1/2" diam., 5,000 pieces; 3/4" through 1" diam., 2,000 pieces.		

Machine Screws & Stove Bolts

	Discount	Mach. Screws	Stove Bolts
Plain Finish			
Cartons	60		60
Bulk			
To 1/4" diam.	Quantity		
1/4" to 5/16" diam.	25,000-and over	60	..
5/16" to 1/2" diam.	15,000-200,000	60	..
Incl.			

Machine Screws & Stove Bolt Nuts

	Discount	Hex	Square
In Cartons		16	19
In Bulk	Quantity		
1/2" diam. & smaller	25,000-and over	15	16

ELECTROPLATING SUPPLIES

Anodes

(Cents per lb, fct allowed in quantity)

Copper	
Roller elliptical, 18 in. or longer, 5000 lb lots	44.50
Electrodeposited	37.50
Brass, 80-20, ball anodes, 2000 lb or more	47.50
Zinc, ball anodes, 2000 lb lots	18.00
(for elliptical add 1¢ per lb)	
Nickel, 99 pct plus, rolled carton, 5000 lb	1.0225
(Rolled depolarized add 3¢ per lb)	
Cadmium	1.45
Tin, ball anodes \$1.05 per lb (approx.)	

Chemicals

(Cents per lb, f.o.b. shipping point)	
Copper cyanide, 100 lb drum	65.90
Copper sulphate, 100 lb bags, per cwt.	22.75
Nickel salts, single, 100 lb bags	36.00
Nickel chloride, freight allowed, 100 lb	45.00
Sodium cyanide, domestic, f.o.b. N. Y., 200 lb drums	23.70
(Philadelphia price 24.00)	
Zinc cyanide, 100 lb	60.75
Potassium cyanide, 100 lb drum	45.50
N. Y.	
Chromic acid, flake type, 10,000 lb or more	30.44

CAST IRON WATER PIPE INDEX

Birmingham	125.8
New York	138.5
Chicago	140.9
San Francisco-L. A.	148.6
Dec. 1955, value, Class B or heavier 5 in. or larger, bell and spigot pipe. Explanation: p. 57, Sept. 1, 1955, issue. Source: U. S. Pipe and Foundry Co.	

STEEL SERVICE CENTERS

Metropolitan Price, dollars per 100 lb.

Cities	City Delivery & Charge	Sheets			Strip	Plates	Shapes	Bars		Alloy Bars			
		Hot-Rolled (18 ga. & hvy.)	Cold-Rolled (15 gage)	Galvanized (10 gage)†	Hot-Rolled		Standard Structural	Hot-Rolled (merchant)	Cold- Finished	Hot-Rolled 4615 As rolled	Hot-Rolled 4140 Annealed	Cold-Drawn 4615 As rolled	Cold-Drawn 4140 Annealed
Atlanta		8.59	9.87	10.13	8.91	9.29	9.40	9.39	13.24*				
Baltimore	\$ 10	8.65	9.35	9.09	9.15	9.10	9.65	9.55	11.80*	16.28	15.28	19.82	19.08
Birmingham		8.18	9.45	10.46	8.51	8.89	9.00	8.99					
Boston	10	10.22	10.50	12.07	11.27	10.42	10.79	10.34	13.45*	16.79	15.79	20.29	19.54
Buffalo	15	8.55	9.75	11.00	8.90	9.35	9.40	9.30	11.60*	16.34	15.55	19.01	19.30
Chicago	15	8.40	9.60	11.05	8.66	9.04	9.15	9.14	9.30	16.20	15.20	19.70	18.95
Cincinnati	15	8.58	9.65	11.10	8.98	9.42	9.71	9.46	11.68*	16.52	15.52	20.02	19.27
Cleveland	15	8.51	9.60	11.15	8.78	9.28	9.54	9.25	11.40*	16.31	15.31	19.81	19.06
Denver	20	9.60	11.84	12.94	9.63	9.96	10.04	10.00	11.19				20.84
Detroit	15	8.66	9.85	11.40	9.03	9.41	9.71	9.45	9.66	15.46	15.48	18.81	19.23
Houston		8.10	8.60		8.15	8.45	8.05	8.10	11.60	16.20	15.25	19.65	18.95
Kansas City	15	9.02	10.27	11.37	9.33	9.71	9.82	9.81	10.22	16.87	15.87	20.37	19.62
Los Angeles		8.70 ^a	11.20- 11.80	12.20	9.15	9.10	9.00	9.10	12.95	17.30	16.35	21.30	20.60
Memphis	15	8.55	9.80		8.60	8.93	9.01	8.97	12.11*				
Milwaukee	15	8.54	9.73	11.19	8.80	9.18	9.37	9.28	9.54	16.34	15.34	19.84	19.09
New York	10	9.27	10.59	11.40	9.74	9.87	9.84	10.09	13.35*	16.16	15.60	20.10	19.35
Norfolk	20	8.20			8.90	8.65	9.20	8.90	10.70				
Philadelphia	10	8.30	9.35	10.71	9.35	9.25	9.20	9.50	12.05*	16.58	15.58	20.08	19.33
Pittsburgh	15	8.50	9.70- 8.60	11.05	8.76	9.05	9.15	9.14	11.40*	16.20	15.20	19.70	18.95
Portland		10.00 ¹	11.75 ²	13.30 ³	11.95 ⁴	11.50 ⁵	11.10 ⁶	9.85 ⁷	15.30*	18.50	17.45	20.75	20.25
San Francisco	10	9.75	11.20 ⁹	11.50	9.85	10.10	9.95	10.25	13.70	17.05	16.35	21.05	20.60
Seattle		10.30	11.55	12.50	10.25	10.10	10.20	10.50	14.70	17.15	16.80	20.65	20.60
Spokane	15	10.45	11.70	12.65	10.65	10.25	10.35	11.15	14.85	17.75	16.95	21.55	20.75
St. Louis	15	8.78	9.98	11.43	9.04	9.42	9.63	9.52	9.93	16.58	15.58	20.08	19.33
St. Paul	15	8.94	10.19	11.64	8.99	9.45	9.53	9.70 ⁷	10.16		15.41		19.21

Base Quantities (Standard unless otherwise keyed): Cold finished bars: 2000 lb or over. Alloy bars: 1000 to 1999 lb. All others: 2000 to 4999 lb. All HR products may be combined for quantity. All galvanized sheets may be combined for quantity. CR sheets may be combined with each other for quantity. **All sizes except 18 and 16 gage. ††10¢ zinc. ‡ Deduct for country delivery. * C1018—1 in. rounds. † 10 ga. x 36" x 120"; ‡ 20 ga. x 36" x 120"; § 26 ga. x 30" x 96"; ¶ 4 1/4" x 1" in lots of 1000 to 9999; * sheared plate 1/4" x 84" in lots of 1000 to 9999; † 3" x 5.70" in lots of 1000 to 9999; ‡ M-1020—1-in. rounds in lots of 1000 to 9999; § 15 ga. & heavier; ¶ 14 ga. & lighter.

(Effective April 13, 1959)

PIG IRON

Dollars per gross ton, f.o.b., subject to switching charges.

Producing Point	Basic	Fdry.	Mail.	Beas.	Low Phos.
Hirshboro, Pa. B6	68.00	68.50	69.00	69.50	
Birmingham R3	62.00	62.50			
Birmingham W9	62.00	62.50	66.50		
Birmingham U4	62.00	62.50	66.50		
Buffalo R3	66.00	66.50	67.00	67.50	
Buffalo H1	66.00	66.50	67.00	67.50	
Buffalo W6	66.00	66.50	67.00	67.50	
Chester P2	66.50	67.00	67.50		
Chicago I4	66.00	66.50	67.00		
Cleveland A5	66.00	66.50	66.50	67.00	71.00
Cleveland R3	66.00	66.50	66.50	67.00	
Duluth I4	66.00	66.50	66.50	67.00	71.00
Erie I4	66.00	66.50	66.50	67.00	71.00
Everett M6	67.00	68.00	68.50		
Fontana K1	75.00	75.50			
Geneva, Utah C7	66.00	66.50			
Granite City G2	67.90	68.40	68.90		
Hubbard Y1			66.50		
Ironton, Utah C7					
Midland C11	66.00				
Minnequa C6	68.00	68.50	69.00		
Monessen P6	66.00				
Neville Ia. P4	66.00	66.50	66.50	67.00	71.00
N. Tonawanda T1		66.50	67.00	67.50	
Sharpville S3	66.00		66.50	67.00	
Sa. Chicago R3	66.00	66.50	66.50	67.00	
Sa. Chicago W8	66.00	66.50	67.00		
Svedeland A2	68.00	68.50	69.00	69.50	
Toledo I4	66.00	66.50	66.50	67.00	
Troy, N. Y. R3	68.00	68.50	69.00	69.50	73.00
Youngstown Y1			66.50		

DIFFERENTIALS: Add, 75¢ per ton for each 0.25 pct silicon or portion thereof over base (1.75 to 2.25 pct except low phos., 1.75 to 2.00 pct) 50¢ per ton for each 0.25 pct manganese or portion thereof over 1 pct, 52¢ per ton for 0.50 to 0.75 pct nickel, \$1 for each additional 0.25 pct nickel. Add \$1.00 for 0.31-0.69 pct phos.

Silvery Iron: Buffalo (6 pct), H1, \$79.25; Jackson J1, I4 (Globe Div.), \$78.00; Niagara Falls (15.01-15.50), \$101.00; Keokuk (14.01-14.50), \$103.50; (15.51-16.00), \$106.50. Add \$1.00 per ton for each 0.50 pct silicon over base (6.01 to 6.50 pct) up to 18 pct. Add \$1.25 for each 0.50 pct manganese over 1.00 pct. Bessemer silvery pig iron (under .10 pct phos.): \$64.00. Add \$1.00 premium for all grades silvery to 18 pct.

† Intermediate low phos.

STAINLESS STEEL

Base price cents per lb. f.o.b. mill

Product	201	202	301	302	303	304	316	321	347	403	410	416	430
Ingots, reroll.	22.75	24.75	24.00	26.25	—	28.00	41.25	33.50	38.50	—	17.50	—	17.75
Slabs, billets	28.00	31.50	29.00	32.75	33.25	34.50	51.25	41.50	46.25	—	22.25	—	22.50
Billets, forging	—	37.75	38.75	39.50	42.50	42.00	64.50	48.75	57.75	29.25	29.25	29.75	29.75
Bars, struct.	43.50	44.50	46.00	46.75	49.75	49.50	75.75	57.50	67.25	35.00	35.00	35.50	35.50
Plates	39.25	40.00	41.25	42.25	45.00	45.75	71.75	54.75	64.75	30.00	30.00	31.25	31.00
Sheets	48.50	49.25	51.25	52.00	56.75	55.00	80.75	65.50	79.25	40.25	40.25	48.25	40.75
Strip, hot-rolled	36.00	39.00	37.25	40.50	—	44.25	69.25	53.50	63.50	—	31.00	—	32.00
Strip, cold-rolled	45.00	49.25	47.50	52.00	56.75	55.00	80.75	65.50	79.25	40.25	40.25	42.50	40.75
Wire CF; Rod HR	—	42.25	43.50	44.25	47.25	47.00	71.75	54.50	63.75	33.25	33.25	33.75	33.75

STAINLESS STEEL PRODUCING POINTS:

Sheets: Midland, Pa., C11; Brackenridge, Pa., A3; Butler, Pa., A7; Vandergrift, Pa., U1; Washington, Pa., W2, J2; Baltimore, El; Middletown, O., A7; Massillon, O., R3; Gary, U1; Bridgeville, Pa., U2; New Castle, Ind., I2; Detroit, M2; Louisville, O., R5.

Strip: Midland, Pa., C11; Waukegan, Cleveland, A5; Carnegie, Pa., S9; McKeesport, Pa., F1; Reading, Pa., C2; Washington, Pa., W2; W. Leechburg, Pa., A3; Bridgeville, Pa., U2; Detroit, M2; Detroit, S1; Canton, Massillon, O., R3; Harrison, N. J., D3; Youngstown, R5; Sharon, Pa., S1; Butler, Pa., A7; Wallingford, Conn., U3 (plus further conversion extras); W1 (25¢ per lb. higher); Seymour, Conn., S13, (25¢ per lb. higher); New Bedford, Mass., R6; Gary, U1, (25¢ per lb. higher).

Bar: Baltimore, A7; S. Duquesne, Pa., U1; Munhall, Pa., U1; Reading, Pa., C2; Titusville, Pa., U2; Washington, Pa., J2; McKeesport, Pa., U1, F1; Bridgeville, Pa., U2; Dunkirk, N. Y., A3; Massillon, O., R3; S. Chicago, U1; Syracuse, N. Y., C11; Watervliet, N. Y., A3; Waukegan, A5; Canton, O., T3, R3; Ft. Wayne, I4; Detroit, R5; Gary, U1; Owensboro, Ky., G5; Bridgeport, Conn., N8.

Wire: Waukegan, A5; Massillon, O., R3; McKeesport, Pa., F1; Ft. Wayne, I4; Newark, N. J., D2; Harrison, N. J., D3; Baltimore, A7; Dunkirk, A3; Monessen, P1; Syracuse, C11; Bridgeville, U2; Detroit, R5.

Structurals: Baltimore, A7; Massillon, O., R3; Chicago, Ill., J4; Watervliet, N. Y., A3; Syracuse, C11; S. Chicago, U1.

Plates: Baltimore, El; Brackenridge, Pa., A3; Chicago, U1; Munhall, Pa., U1; Midland, Pa., C11; New Castle, Ind., I2; Middletown, A7; Washington, Pa., J2; Cleveland, Massillon, R3; Coatesville, Pa., C15; Vandergrift, Pa., U1; Gary, U1.

Forging billets: Midland, Pa., C11; Baltimore, A7; Washington, Pa., J2; McKeesport, F1; Massillon, Canton, O., R3; Watervliet, A3; Pittsburgh, Chicago, U1; Syracuse, C11; Detroit, R5; Munhall, Pa., S. Chicago, U1; Owensboro, Ky., G5; Bridgeport, Conn., N8.

(Effective April 13, 1959)

"EVERYTHING HINGES ON HAGER!"

We'll make **IT** for you! For standard (5,000 different types and sizes) or special hinges, write or wire: C. Hager & Sons Hinge Mfg. Co., Victor & "I" Street, St. Louis 4, Mo.
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Founded 1849, Every Hager Hinge Swings on 100 Years of Experience

**SMOOTH...
SWIFT...
SAFE...
SILENT...**

**ELECTROLIFT
WORM-DRIVE HOISTS**

Dependable, long-lasting ElectroLift hoists are used by the thousands in America's largest manufacturing plants. Features of these units—ranging from ¼- to 10-ton capacity—include:

- Worm-drive design for safe, sure braking action
- Use of quality components and materials for trouble-free performance
- Fully enclosed motor and gearing for clean, quiet operation
- Greater compactness for close headroom, safer action

For details on speed, models and operation, consult your classified directory for the ElectroLift representative nearest you.

ELECTROLIFT

204 Sargeant Avenue Clifton, N. J.

FERROALLOY PRICES

Ferrochrome

Cents per lb contained Cr, lump, bulk, carloads, del'd. 67-71% Cr, 30-1.00% max. Si.			
0.02% C....	41.00	0.50% C....	38.00
0.05% C....	39.00	1.00% C....	37.75
0.10% C....	38.50	1.50% C....	37.50
0.20% C....	38.25	2.00% C....	37.25
4.00-4.50% C, 60-70% Cr, 1-2% Si...	28.75		
3.50-5.00% C, 57-64% Cr, 2.00-1.50% Si			28.25
0.025% C (Simplex)	36.75		
8% max C, 50-55% Cr, 6% max Si...	25.75		
4 1/2% max C, 88-91% Cr, 2% max Si	26.50		

High Nitrogen Ferrochrome

Low-carbon type 0.75% N. Add 5¢ per lb to regular low carbon ferrochrome max. 0.10% C price schedule.

Chromium Metal

Per lb chromium, contained, packed, delivered, ton lots, 97.25% min. Cr, 1% max. Fe.

0.10% max. C	\$1.29
9 to 11% C, 88-91% Cr, 0.75% Fe...	1.38

Electrolytic Chromium Metal

Per lb of metal 2" x D plate (1/4" thick) delivered packed, 99.80% min. Cr. (Metallic Base) Fe 0.20 max.

Carloads	\$1.15
Ton lots	1.17
Less ton lots	1.19

Low Carbon Ferrochrome Silicon

(Cr 39-41%, Si 42-45%, C 0.05% max.) Carloads, delivered, lump, 3-in. x down, packed.

Price is sum of contained Cr and contained Si.		
	Cr	Si
Carloads, bulk	28.25	14.60
Ton lots	33.50	16.05
Less ton lots	35.10	17.70

Calcium-Silicon

Per lb of alloy, lump, delivered, packed. 30-33% Cr, 60-65% Si, 3.00 max. Fe.

Carloads, bulk	24.00
Ton lots	27.95
Less ton lots	29.45

Calcium-Manganese-Silicon

Cents per lb of alloy, lump, delivered, packed.

16-20% Ca, 14-18% Mn, 53-59% Si.	
Carloads, bulk	23.00
Ton lots	26.15
Less ton lots	27.15

SMZ

Cents per pound of alloy, delivered, 60-65% Si, 5-7% Mn, 5-7% Zr, 20% Fe 1/2 in. x 12 mesh.

Ton lots	21.15
Less ton lots	22.40

V Foundry Alloy

Cents per pound of alloy, f.o.b. Suspension Bridge, N. Y., freight allowed, max. St. Louis, V-5; 38-42% Cr, 17-19% Si, 8-11% Mn, packed.

Carload lots	18.45
Ton lots	19.95
Less ton lots	21.20

Graphidox No. 4

Cents per pound of alloy, f.o.b. Suspension Bridge, N. Y., freight allowed, max. St. Louis, Si 48 to 52%, Ti 9 to 11%, Ca 5 to 7%.

Carload packed	19.20
Ton lots to carload packed	21.15
Less ton lots	22.40

Ferromanganese

Maximum base price, f.o.b., lump size, base content 74 to 76 pct Mn.

Producing Point	Cents per-lb
Marietta, Ashtabula, O.; Alloy, W. Va.; Sheffield, Ala.; Portland, Ore.	12.25
Johnstown, Pa.	12.25
Neville Island, Pa.	12.25
Sheridan, Pa.	12.25
Philo, Ohio	12.25
S. Duquesne	12.25
Add or subtract 0.1¢ for each 1 pct Mn above or below base content.	
Briquets, delivered, 66 pct Mn:	
Carloads, bulk	14.80
Ton lots packed in bags	17.20

Spiegeleisen

Per gross ton, lump, f.o.b. Palmerton, Pa., and Neville Island, Pa.

Manganese Silicon	
16 to 19% 3% max.	\$109.50
19 to 21% 3% max.	102.50
21 to 23% 3% max.	105.00

Manganese Metal

2 in. x down, cents per pound of metal delivered.

95.50% min. Mn, 0.2% max. C, 1% max. Si, 2.5% max. Fe.	
Carload, packed	45.75
Ton lots	47.25

Electrolytic Manganese

F.o.b. Knoxville, Tenn., freight allowed east of Mississippi, f.o.b. Marietta, O., delivered, cents per pound.

Carloads	34.00
Ton lots	36.00
250 to 1999 lb	38.00
Premium for Hydrogen - removed metal	0.75

Medium Carbon Ferromanganese

Mn 80 to 85%, C 1.25 to 1.50, Si 1.50% max., carloads, lump, bulk, delivered, per lb of contained Mn

	25.50
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Low-Carb Ferromanganese

Cents per pound Mn contained, lump size, packed, del'd Mn 85-90%.

Carloads	Ton	Less
0.07% max. C, 0.06% (Bulk) P, 90% Mn	37.15	39.95
0.07% max. C	35.10	37.90
0.10% max. C	34.35	37.15
0.15% max. C	33.60	36.40
0.30% max. C	32.10	34.90
0.50% max. C	31.60	34.40
0.75% max. C, 80.85% Mn, 5.0-7.0% Si ...	28.60	31.40
	32.60	

Silicomanganese

Lump size, cents per pound of metal, 65-68% Mn, 18-20% Si, 1.5% max. C for 2% max. C, deduct 0.2¢ f.o.b. shipping point.

Carloads bulk	12.80
Ton lots, packed	14.45
Carloads, bulk, delivered, per lb of briquet	15.10
Briquets, packed pallets, 3000 lb up to carloads	16.30

Silvery Iron (electric furnace)

Si 15.50 to 16.00 pct, f.o.b. Keokuk, Iowa, or Wenatche, Wash., \$106.50 gross ton, freight allowed to normal trade area. Si 15.01 to 15.50 pct, f.o.b. Niagara Falls, N. Y., \$93.00.

Silicon Metal

Cents per pound contained Si, lump size, delivered, packed.

	Ton lots	Carloads
98.25% Si, 0.50% Fe...	24.95	23.65
98% Si, 1.0% Fe ...	24.45	23.15

Silicon Briquets

Cents per pound of briquets, bulk, delivered, 40% Si, 2 lb Si, briquets.

Carloads, bulk	8.00
Ton lots, packed	10.80

Electric Ferrosilicon

Cents per lb contained Si, lump, bulk, carloads, f.o.b. shipping point.

50% Si....	14.60	75% Si....	16.90
65% Si....	15.75	85% Si....	18.60
	90% Si....	20.00	

Ferrovanadium

50-55% V delivered, per pound, contained V, in any quantity.

Openhearth	3.20
Crucible	3.30
High speed steel	3.40

Calcium Metal

Eastern zone, cents per pound of metal, delivered.

	Cast	Turnings	Distilled
Ton lots	\$2.05	\$2.95	\$3.75
100 to 1999 lb.	2.40	3.30	4.55

(Effective April 13, 1959)

Alsilfer, 20% Al, 40% Si, 40% Fe, f.o.b. Suspension Bridge, N. Y., per lb.

Carloads, bulk	9.85¢
Ton lots	11.20¢

Calcium molybdate, 43.6-46.6% f.o.b. Langeloth, Pa., per pound contained Mo

	\$1.50
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Ferrocolumbium, 50-60% lb, 2 in. x D, delivered per pound contained Cb.

Ton lots	\$3.90
Less ton lots	3.95

Ferro-tantalum-columbium, 20% Ta, 40% Cb, 0.30% C, del'd ton lots, 2-in. x D per lb con't Cb plus Ta

	\$3.40
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Ferromolybdenum, 55-75%, 200-lb containers, f.o.b. Langeloth, Pa., per pound contained Mo..

	\$1.76
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Ferrophosphorus, electric, 23-26%, car lots, f.o.b. Siglo, Mt. Pleasant, Tenn., \$5.00 unitage, per gross ton

	\$120.00
10 tons to less carload	\$131.00

Ferrotitanium, 40% regular grade 0.10% C max., f.o.b. Niagara Falls, N. Y., and Cambridge, O., freight allowed, ton lots, per lb contained Ti

	\$1.35
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Ferrotitanium, 25% low carbon, 0.10% C max., f.o.b. Niagara Falls, N. Y., and Cambridge, O., freight allowed, ton lots, per lb contained Ti

	\$1.50
Less ton lots	\$1.54

Ferrotitanium, 15 to 18% high carbon, f.o.b. Niagara Falls, N. Y., freight allowed, carload per net ton

	\$240.00
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Ferrotungsten, 1/4 x down packed, per pounds contained W, ton lots delivered

	\$2.15
	(nominal)

Molybdenic oxide, briquets per lb contained Mo, f.o.b. Langeloth, Pa.

	\$1.49
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bags, f.o.b. Washington, Pa., Langeloth, Pa.

	\$1.38
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Simanal, 20% Si, 20% Mn, 20% Al, f.o.b. Philo, Ohio, freight allowed per lb.

Carload, bulk lump	18.50¢
Ton lots, packed lump	20.50¢
Less ton lots	21.00¢

Vanadium oxide, 86-89% V₂O₅ per pound contained V₂O₅

	\$1.38
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Zirconium silicon, per lb of alloy 35-40% del'd, carloads, bulk..

	26.25¢
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12-15%, del'd lump, bulk-carloads

	9.25¢
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Boron Agents

Boroal, per lb of alloy del. f.o.b. Philo, Ohio, freight allowed, B 3-4%, Si 40-45%, per lb contained B

2000 lb carload	\$5.50
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Bortram, f.o.b. Niagara Falls. Ton lots per pound

	45¢
--	-----

Less ton lots, per pound

	50¢
--	-----

Corbortam, Ti 15-21%, B 1-2%, Si 2-4%, Al 1-2%, C 4-5-7.5%, f.o.b. Suspension Bridge, N. Y., freight allowed.

Ton lots per pound	14.00¢
--------------------------	--------

Ferroboron, 17.50 min. B, 1.50% max. Si, 0.50% max. Al, 0.50% max. C, 1 in. x D, ton lots.

F.o.b. Wash. Pa., Niagara Falls, N. Y., delivered 100 lb up	
10 to 14% B .....	.85
14 to 19%	1.20
19% min. B	1.50

Grainal, f.o.b. Cambridge, O., freight allowed, 100 lb and over No. 1

	\$1.05
--	--------

No. 79

	50¢
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Manganese-Boron, 75.00% Mn, 17.50% B, 5% max. Fe, 1.50% max. Si, 3.00% max. C, 2 in. x D, del'd.

Ton lots (packed)	\$1.48
Less ton lots (packed)	1.57

Nickel-Boron, 15-18% B, 1.00% max. Al, 1.50% max. Si, 0.50% max. C, 3.00% max. Fe, balance Ni, del'd less ton lots

	2.15
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ELECTRICAL POWER EQUIPMENT IN STOCK

DC MOTORS

Qu.	H.P.	Make	Type	Volts	RPM
1	3900	New Elliott	Enc. F.V.	475	320
1	3000	New Whse.	Enc. F.V.	525	600
1	2250	New Elliott	Enc. F.V.	600	200/300
1	2200	G.E.	MCF	600	400/500
1	1750	New Elliott	Enc. F.V.	250	175/350
8	1500	New Whse.	Enc. F.V.	525	600
1	1300	G.E.	MCF-12	300	200/400
1	1200	G.E.	MCF	600	450/600
1	1000	Whse.		500	300/2000
1	940	Whse.	QM	250	140/170
2	940	S.S.	Enc. F.V.	600	800/1000
2	800	G.E.	MCF	250	400/750
3	765	Allis Ch.	MHC	550	1012/1320
2	750	G.E.	MCF	600	450/900
1	750	G.E.	MCF	600	300/720
1	750	G.E.	M.F.	600	120/360
2	645	S.S.	Enc. F.V.	300	1000
4	600	Whse.		250	275/550
1	500	G.E.	MPC-10	250	188/400
2	450	Whse.		550	415
2	400	G.E.	CT-275	300	1000/1500
3	325	Allis Ch.	MHC	250	450/900
1	300	Cr. Wh.	H-102 B.B.	230	1200
1	225	G.E.B.B.	T-664 D.P.	240	1150/3600
1	200	Rel. B.B.	CB-207-1	230	850/1200
1	200	Whse.	CMC-65H	230	1150
1	150	Cr. Wh.	TLC-74	250	1150/3500
1	150	G.E.B.B.	CD	600	250/750
1	120	G.E.B.B.	TLC-50	250	1950/5000
1	125/250	New Whse.	CB-210.3	230	300/1200
1	120	Rel. B.B.	1050T	230	575/900
2	125	Whse.	SK-190	230	450/1200
1	125	Whse.	SK-185	230	350/1050
1	100	G.E.	CDP-145	230	1750
1	80	Whse.	SK-123.9	240	2000/4500
1	75	G.E.B.B.	CD-1235-D.P.	600	850
1	60/75	Rel. B.B.	T-664-D.P.	240	300/1200
1	50	G.E.	CD-1136	230	690/1050
1	30/40	Whse. B.B.	SK-131, TEFC	250	500/1500
1	25/33	Rel. B.B.	TY563	240	300/1200
6	40	Rel. B.B.	385P, TEFC	230	500/1500
1	30/40	Rel. B.B.	T-564-D.P.	240	300/900

MERCURY ARC RECTIFIERS

3-150 KW. G.E. Sealed Tube Ignitron Unit Sub-station load centers 275 V. D.C., 2300 V. A.C. Pyranol filled transformers complete.

2-150 KW. G.E. Ignitron, 245 V. D.C.-230 V. A.C., air cooler transformers with controls.

MG SETS—3 Ph. 60 Cy.

Qu.	K.W.	Make	RPM	DC Volts	AC Volts
1	2000	G.E.	514	600	2300/4600
2	1750/2100	G.E.	514	250/300	2300/4600
1	1750	G.E.	514	600	2300/4600
1	1500	G.E.	720	600	6000/13200
1	1500	S.S. 3 unit	720	600	11000/6000
1	1500	Cr. Wh.	4 unit	720	100
1	500	G.E.	900	125/250	2300
1	350	G.E.	900	125	440/2300/4160
1	300	G.E.	1200	250	2300/4000
1	300	G.E.	1200	250	440/2300
1	250	G.E.	900	250	440/2300
1	240	Whse.	900	125	220/440
1	200	Whse.	1200	550	2200
1	200	El. Mhy.	1200	250	2300/4600
1	150	G.E.	1200	275	2300
1	150	Whse.	1200	275	2300
1	150	G.E.	1200	125	440
1	140	Cr. Wh.	600	125/250	2300
1	100	G.E.	1170	250	220/440
1	100	Cr. Wh.	1800	240	440
2	100	Cr. Wh.	1160	525	220/550
1	100	G.E.	1200	250	2400/4100
2	75	Whse.	1200	125	440

TRANSFORMERS

Qu.	KVA	Make	Type	Ph.	Voltagages
3	3333	Whse.	OISC	1	13800 x 2300
3	1000	G.E.	CA/FA	1	13800 x 230/460
2	750	G.E.	Pyranol	1	4800x5/55-255/165
3	500	Kuhl	OISC	1	13200 x 5000
6	333	G.E.	HS	1	7200/12470VX
3	333	G.E.	OISC	3	2400/4160Y
3	150	G.E.	OISC	3	3400/4160Y x 600
3	100	G.E.	OISC	1	3300x2300/4000Y
3	100	G.E.	HS	1	4800/8320V x
1	50	Mel.	OISC	3	120/240
3	50	Al. Ch.	OISC	3	13200 x 240-480
					2400 x 120/240

CRANE & MILL MOTORS 230 V., D.C.

Qu.	H.P.	Make	RPM	Type
12	12/14	Whse.	700/600	MCA-30, Series
1	20	Whse.	975	K-5 Series
2	25	G.E.	600	MD8-408
2	25	G.E.	725	CO-1808, Series
1	35	Whse.	480	CK-9 Comp. S.B.
1	35	Whse.	480	CK-9 R. B.
1	45	Whse.	600	CK-9 Comp. S.B.
3	50	G.E.	650	COM-1830 Comp.
3	50	Whse.	325	CK-9 Shunt R.B.
2	50	Whse.	600	CK-9 Comp. R.B.
1	50	G.E.	525	COM-1830 AEB.B.
1	50	Cr. Wh.	550	SW-50 Comp.
1	100	G.E.	475	OO-1832 S.B.
6	100/140	Whse.	500/415	MC-90 R.B.

RE-NU-BILT By

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Tel. Oldfield 3-3334

THE CLEARING HOUSE

Chicago Sales Gains Should Continue

Used machinery dealers there predict good selling through May with another upturn coming in the third quarter.

Right now sales gains are being chalked up for nearly all types of equipment.

■ Tool sales continue holding at strong levels in the Midwest this month, with fairly strong movement of equipment to buyers outside the area.

West Coast buyers have made purchases in the area, indicating there is a fairly good market for heavy production equipment.

Upswing Through May—Forecasts for used tool sales at Chicago during the second quarter are optimistic. Industry estimates indicate a continuing gradual upswing until at least late May. It's felt this upturn would have assumed a faster pace, but the amount of money tied up in steel inventories has forced some prospective buyers to put off tool purchases.

Rebuilding Slower—Rebuilding business has not shown the gains reported in reconditioned tools. Some rebuild shops, after fairly strong activity in January, are running with a low backlog which they say is still shrinking. A five-day work week is still common. There are quite a few inquiries but not enough of these are being converted into sales to boost backlog levels.

Foundry pattern shops have been a surprisingly good source of used

tool business. A few shops have done more purchasing in the first three months of 1959 than they did in all of 1958.

Forge Shops Busier—Some heavy lathe and press business has come from the farm equipment industry and electrical machinery producers. Forge shops or job machine shops serving the forging industry are getting busier. But they haven't shown the business gains which had been expected.

The slow gains seem to be felt in nearly all types of equipment including toolroom or production units. Sheet metal forming equipment is strengthening seasonally. Production equipment sales, usually a source of greater profit, are more meaningful to most tool sellers. Gains in this quarter suggest that tool dealers will show a better profit position at the end of second quarter than the slow rate of improvement in the sales curve indicates.

Sales Slow in South—Sales to tool buyers in Southern areas aren't showing quite the strength they have in past years. Fourth quarter last year indicated gains in that area, but sales thus far this year haven't fulfilled that earlier promise.

The outlook for the remainder of second quarter looks good. The surprising reaction is the amount of strength that is foreseen for third quarter. Steel strike or not, used tool men seem convinced there will be an upswing in metalworking during third quarter. And they believe it will carry used and rebuilt tools to higher levels.

CONSIDER GOOD USED EQUIPMENT FIRST

BENDING ROLLS

10" x 10 Ga. Bertuch No. 6 Initial Type
12" x 10" Hilles & Jones Pyramid Type
14" x 1 1/8" Bertuch Initial Type—LATE
22" x 1/2" BALDWIN PYRAMID TYPE—LATE

BRAKE—LEAF TYPE

12" x 1/2" Drels & Krump
BRAKES—PRESS TYPE
500 ton Pacific 12" Bending Length, Hydraulic
90 ton Niagara, Model 90-8-10

CRANES—OVERHEAD ELECTRIC TRAVELING

3 ton P&H 40' Span 220 Volt D.C.
3 ton P&H 57' Span 220/3/60 A.C.
8 ton P&H 55' Span 220/3/60
10 ton P&H 39' Span 220 Volt D.C.
10 ton Milwaukee 57' Span 220 Volt D.C.
10 ton Shaw 48' Span 220 Volt D.C.
10 ton Whiting 75' Span 220/3/60 A.C.
10 ton Shaw 120 Span 220 Volt D.C.
15 ton N-B-P 100' Span 220/3/60 A.C.
30 ton Shaw 70' Span 220 Volt D.C.
120 ton Niles 67' Span 220 Volt D.C.
120 ton Shepard Niles 77' Span 220/3/60 A.C.

CRANES—TRAMRAIL TRAVELING

56 ft. Bridge, Three 215 ft. Runways
82 ft. Bridge, Four Runways 215' & 135'
Motors 208 Volt 3 Phase 60 Cycle

DRAW BENCHES

7,000 lb. Draw Bench, 51 ft. Draw
10,000 lb. Draw Bench, 50 ft. Draw
35,000 lb. Draw Bench, 41 ft. Draw

FORGING MACHINES

1" to 5" Acme, Ajax, National

FURNACES—HEAT TREATING

Electric Furnace Co. Batch Type, Max Load 10,000#
Effective Hearth Area 10' x 12' 6" x 40" hl.

HAMMERS—BOARD DROP—STEAM DROP—STEAM FORGING

800 lb. to 12,000 lb. incl.

LATHE

24" Swing x 48" Monarch Model 22GM—New 1942

LEVELERS—ROLLER

50" Processor & Leveler, Capacity 50" x .108"

60" Guide 17 Rolls 4 1/2" Dia.

72" Leveler 17 Rolls 2 1/2" Backed Up

MULTI SLIDE MACHINE

No. 25 U.S. Multi-Slide, Max. Capy. 4 1/2" wide x .089

NIBBLER

Pullmax Model 2, Capacity 11/32"

PRESS—EMBOSSING & COINING

#664 Toledo 600 ton, 5" Stroke

PRESSES—HYDRAULIC

300 ton Southwark, Bed 38" x 28", Stroke 25"

500 ton Watson Stillman Piercing Press, 48" x 72"

500 ton HPM Pastaverse, Bed 26" x 36"

600 ton Birdboro, Platen 48 x 48", Stroke 15"

1000 ton Southwark, Bed 44" x 54", Stroke 20"

4500 ton B-L-H Bed 68 x 68", Stroke 40"

PRESSES—STRAIGHT SIDE

215 ton Clearing, Bed Area 36 x 42", Stroke 24"

260 ton Cleveland #7F, Bed 42 x 84", Stroke 12"

900 ton Hamilton 45-1800, Bed 101x181", Stroke 30"

PUNCH & SHEAR COMBINATIONS

#1 1/2 Buffalo Universal Ironworker

EF Cleveland, 60" Throat

SS Kling, 36" Throat

Rock River Double End, 24" Throat, Capy. 1 1/4"

ROLLING MILLS

3 1/2" x 7" Six Roll Cluster Mill

10" x 14" Single Stand Two High

16" x 24" Two Stand Two High

20" x 28" Single Stand Two High

26" x 60" Single Stand Two High

10" Morgan Merchant Mill

12" x 32" Birdboro 3-Hi Bar Mill

22" x 40" Lewis 3-Hi Sheet Mill

ROLLS—FORMING

6 Stand Dahlstrom #450-6 for stock to 4 1/2" wide

18 Stand Custom Built, 2 1/2" Shaft, will take 36" wide

ROLL—PLATE STRAIGHTENING

72" McKay, 20 Rolls 15" Dia. Infeed & Outfeed

Rolls, 150 H.P. Main Drive Motor

SHEAR—GATE

8' x 1" RD Wood Hydraulic

SHEAR LINE

38" Hallden Drum Type, Capy. 33-38 Ga.

SHEAR—ROTARY

No. 22A Quickwork Whiting 3/16" Capacity

SHEARS—SQUARING

8" x 14 Ga. Edwards, Motor Drive—LATE

10" x 10 Ga. Wyssong & Miles

10" x 1/2" Niagara #810

10" x 3/16" Cincinnati #1412

SLITTER

24" Torrington Slitting Line, 3 1/2" Arbor

STRAIGHTENERS

Torrington #1734 12-Roll, Capy. 1 1/4", Rd. 1-9/16"

1/2" Shuster Straightener, 12 Ft. Cut-off

SWAGING MACHINE

#6A Fenn, Capy. 3 1/4" Tube, 1 1/4" Solid, 10" Die

Length, With Hydraulic Feed

TESTING MACHINES

20,000 lb. Baldwin Univ. Hydraulic

60,000 lb. Southwark-Emery Universal Hydraulic

500,000 lb. Olsen, Super DeLuxe Compression

WIRE DRAWING MACHINES

Type B Morgan 4-Block Capy. #3' Rod down

Superior 5-Block 20 Dia

Superior 7-Draft Cone Type, Capy. 14 Ga. down

Vaughn 5 Block, Ea. block M.D. Capy. # down

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STRUTHERS WELLS CORP.

MACHINE TOOLS

1—24" x 23 Ft. C.C. MONARCH ENGINE
LATHE, Serial 10474, 27 1/2" swing, 4-jaw
chuck, two carriages, taper attachments,
steadyrests, 30 HP., AC

3—NILES TIMESAVER BORING LATHES,
Serial 22299, 22300, 22301. 33' x 12" diam-
eter maximum depth bore, 20 1/4" maximum
work diameter, 6" maximum bar diam-
eter, spotting carriage, bar supports and
tailstock. 25 HP., AC

1—Giddings & Lewis #45 Table Type Hor-
izontal Boring Mill—Serial 8144, 15 HP DC

1—W. P. Hill Opposed Spindle Tube Sheet
Drilling Machine, capacity two 1 1/4" holes,
20 HP AC

1—3 H-12 LIBBY TURRET LATHE, 12 1/2" hole,
28"—4 jaw chuck, extra long bed for 13'
between chuck and turret, crosssliding
turret and taper attachment, 30 HP, DC

CRANES

1—10 Ton P&H O.E.T. CRANE, cab operated,
Serial 10422, lift 14'-11", span 39'-0 1/2", 3
motors, 230 volt DC

1—7 1/2 Ton SHAW O.E.T. CRANE, cab op-
erated, Serial 2416, 3 1/2 ton auxiliary hoist,
lift 34'-1" span 40'-0 3/4", 4 motors, 230
volt DC

1—5 ton SHAW O.E.T. CRANE, cab operated,
Serial 1436, Lift 11'-2", span 31'-0 1/2", 3
motors, 230 volt DC

ALL THE ABOVE IN GOOD TO EXCELLENT CONDITION
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FOR SALE

1—8" Diameter x 10" Face 2-Hi
Cold Mill

1—3" Rd. Cap. Open End Vertical
Bar Shear

1—2 3/4" Cap. Buffalo Billet Shear

1—12" Dia. x 16" Face 2-Hi Skin
Pass Mill

1—5-Roll Abramson Tube Straight-
ener 3/4" to 3" O.D. Tube

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FOR SALE

COMPLETE STRIP ROLLING MILL

Late Type, Still Set-Up In Plant

BLISS 4 Stand Tandem, continuous strip mill,
rolls 16" diameter x 24" face, individual 250
h.p. D.C. variable speed motors & controls.
Equipped with motor driven recoiler.

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Eastern Rebuilt Machine Tools

THE SIGN OF QUALITY—THE MARK OF DEPENDABILITY

PLAIN CYLINDRICAL GRINDERS

No. 5 Brown & Sharpe Plain, m.d., 1942

No. 20—10x18" cap. Brown & Sharpe Plain,

m.d.

4x12" Landis Type H Knee Hole Type, m.d.

6x15" Cincinnati Plain Hydraulic, m.d.

6x18" Cincinnati Model EA, m.d.

6x18" Landis Type C Hydraulic, m.d., late

6x18" Norton Plain Grinder, m.d.

10x18" Cincinnati Plain Hydraulic, Model ERR,

m.d., Filmatic Spindle, 1943

10x18" Cincinnati Model EA, m.d.

10x18" Norton Type C, m.d., latest

10x36" Cincinnati Hydraulic, m.d.

10x36" Norton Type C, m.d.

10x36" Landis Type CH Plain, m.d.

10x48" Cincinnati Model ER Plain Hydraulic,

m.d.

12x36" Landis Plain Self-Contained, m.d.

14x36" Landis Type C, 1945

16x96" Cincinnati Plain, m.d.

16x40"x120" Cincinnati Plain Heavy Duty, 1953

16"x120" Landis Type B Plain H.D., Hydraulic

m.d., late

18"x36" Landis Type C, m.d.

18"x72" Norton Type C, mechanical, m.d.

23"x36" cc Norton Type C, m.d.

23"x72" cc Type C Norton Semi-Auto. Hy-

draulic

42"x72" cc Norton, m.d.

CYLINDER GRINDERS

No. 50 Heald, m.d., 1945

No. 73 Heald Airplane Cylinder Grinder,

m.d., new

No. 78 Heald Centerless Cylinder, m.d.

EMERY GRINDERS

48" Double End U.S. Electrical Co. Buffer

No. 5D Gardner H.D. Polishing Stand, 1948

DISC GRINDERS

No. 14A Gardner Opposed Single, m.d.

No. 186—36" cap. Gardner, m.d., latest

No. 121 Hanchett Prod. Face Grinder, m.d.

Model 372-53" Besly Single Spindle Vertical,

m.d.

We carry an average stock of 2,000 machines in our 11 acre plant at Cincinnati. Visitors welcome at all times

THE EASTERN MACHINERY COMPANY

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MElrose 1241 "TWX" CI 174

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ROLLING MILLS—STEEL WORKS EQUIPMENT

1—AUTOMATIC COOLING BED FOR BARS up to 2" dia. consists of run-in table, cascade section, shuffle bar section, runoff table, with all electric, 200 ft. long.

1—21" & 32" x 77" TANDEM COLD REDUCTION MILL, 4-high, 3 stands.

1—18" & 48" x 42" TANDEM COLD REDUCTION MILL, 4-high, 5 stands.

1—28" x 40" HOT STRIP MILL, 2-high, reversing, with 2500 HP D.C. motor generator, etc.

1—25" x 42" x 66" HOT STRIP MILL, 4-high.

1—16" x 22" COLD MILL, 2-high.

1—8 x 10" COLD MILL including uncoiler, recoiler and edging rolls.

2—28 3-HIGH ROLL STANDS.

1—New 18" BAR MILL, one 3-high roll stand, pinion stand.

1—New 12" BAR MILL, four 3-high stands, pinion stand.

1—12" MERCHANT BAR MILL with 18" roughing mill and heating furnace.

1—9" BAR MILL, 3-high.

2—MORGAN TRAVELING TILTING TABLES for 24" 3-high bar mill.

1—34" x 192" ROLL GRINDER.

2—65-TON ELECTRIC MELTING FURNACE, TOP CHARGE, with all electrical and mechanical equipment, including 15,000 KVA and 13,333 KVA transformers.

1—New top-charge ELECTRIC MELTING FURNACE with 2000 KVA transformer 13,200 volts, 3 phase, 60 cycle.

2—PACK FURNACES for hot sheet mills 62" x 60" double chamber.

1—ROLL LATHE, ENCLOSED HEADSTOCK, up to 36" dia. rolls.

1—OPEN HEARTH CHARGING MACHINE, 5 ton capacity 11" track gauge.

1—SIDE TRIMMER, Steirne, maximum width 48", makes 2 cuts 3/16" mild steel.

1—SHUSTER STRAIGHTENING AND CUTTING MACHINE, cap. 1" rd.

1—DORE WIRO-MATIC straightening and cutting-off machine 1/16" to 5/32" dia. 12' long.

1—UNITED HOT SAW, 50" dia. blade sliding frame, 4'9" stroke.

1—PROCESSOR AND LEVELER, average gauge .109" 50" wide, 100 to 600 FPM.

1—DRAWBENCH, 30,000 lb., length 29 ft.

1—3000 HP GEAR DRIVE, ratio 500 to 73.7 RPM.

1—3000 HP GEAR DRIVE, ratio 500 to 95.8 RPM.

1—3000 HP GEAR DRIVE, ratio 16.2 to 1.

1—1200 HP GEAR DRIVE, ratio 5.92 to 1.

1—1200 HP GEAR DRIVE, 353 to 94.6 RPM, 3.73 to 1 ratio.

1—3500 HP MOTOR, 1000/6000 volts, 3 phase, 60 cycle, 514 RPM, synchronous, never used.

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GUARANTEED
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MOTORS • MG SETS
GENERATORS
HOISTS • COMPRESSORS • TRANSFORMERS
UNITS OF EVERY SIZE AND DESCRIPTION

SLIP RING MOTORS

3 phase, 60 cycle, 220 or 440 volts
(*2300 volts or higher)

H.P.	MAKE	TYPE	SPEED
2500	*G.E.	MT (Mill Type)	257
1100	*G.E.	MT	720
1000	*G.E.	M-575-S	1200
1000	*West.	CW	450
600	*G.E.	M-6345-S	1800
500	G.E.	M-6345	1200
400	*G.E.	MTP-565	1200
350	*Al-Ch	ARYW	1800
300	Cr-WH	SR70-R	1800
250	Al-Ch	ARY-625	1800
250	*G.E.	I-M-17A	720
200	G.E.	I-M-16	600
200	*West.	CW-1950A	514
150	Cr-WH	SR-50R	1800
150	G.E.	I-M-15A	600
125	G.E.	I-M-15A	600
100	G.E.	I-E-13A	1800
100	G.E.	MT350	720
100	G.E.	I-M-15A	425
75	West.	CW-770	1200
75	G.E.	MT-347	1200
75	G.E.	MT-350	900
75	G.E.	MT-352	720
75	G.E.	I-M-10	600
60	G.E.	MT-350	1200
60	*West.	CW-762C	900
50	*G.E.	MT-356	1200

SPECIAL NEW WESTINGHOUSE MOTOR STARTERS

Magnetic, Primary Resistance, Single step—3/60—
Class II—400. Size 5 Used with Squirrel Cage
Motor. Only 6 left in stock.

WE'LL SELL, BUY OR TRADE
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ROLL GRINDERS

36" x 240" CINCINNATI
60" x 192" CINCINNATI

Traveling Wheel Head
Filmatic Bearing—Hydraulic Feed
Crowning Attachment—Motors—Controls
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LANG MACHINERY COMPANY, INC.
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Grant 1-3594

24" x 28" Hendey Geared Head Lathe, M.D.
22 1/2" Centers
62" King Vert. Boring Mill, R.H. Swivel Head
L.H. Turret Hd., Side Hd., M.D.
No. 1/2, No. 1 1/2 Buffalo Univ. Ironworkers, M.D.
600 Ton Southwark Hyd. Inclined Wheel Press
6' x 1/4" Lown Initial Bending Roll M.D.
FALK MACHINERY COMPANY
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OVER 1,000 NEW AND USED
MACHINE TOOLS IN STOCK
WRITE FOR LATEST STOCK LIST
MILES MACHINERY COMPANY
2041 EAST GENESEE • SAGINAW, MICH. PL. 2-3105

FOR SALE

MUST BE MOVED IMMEDIATELY

700 TON AJAX HIGH SPEED FORGING PRESS

Manufactured in 1946
AIR FRICTION CLUTCH
BED AREA 28" x 42"
60 STROKES PER MINUTE
6" STROKE
24" SHUT HEIGHT

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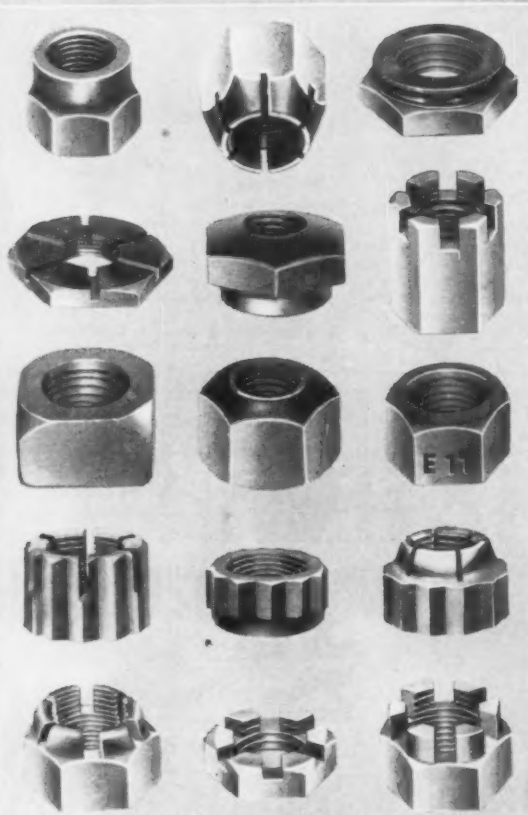
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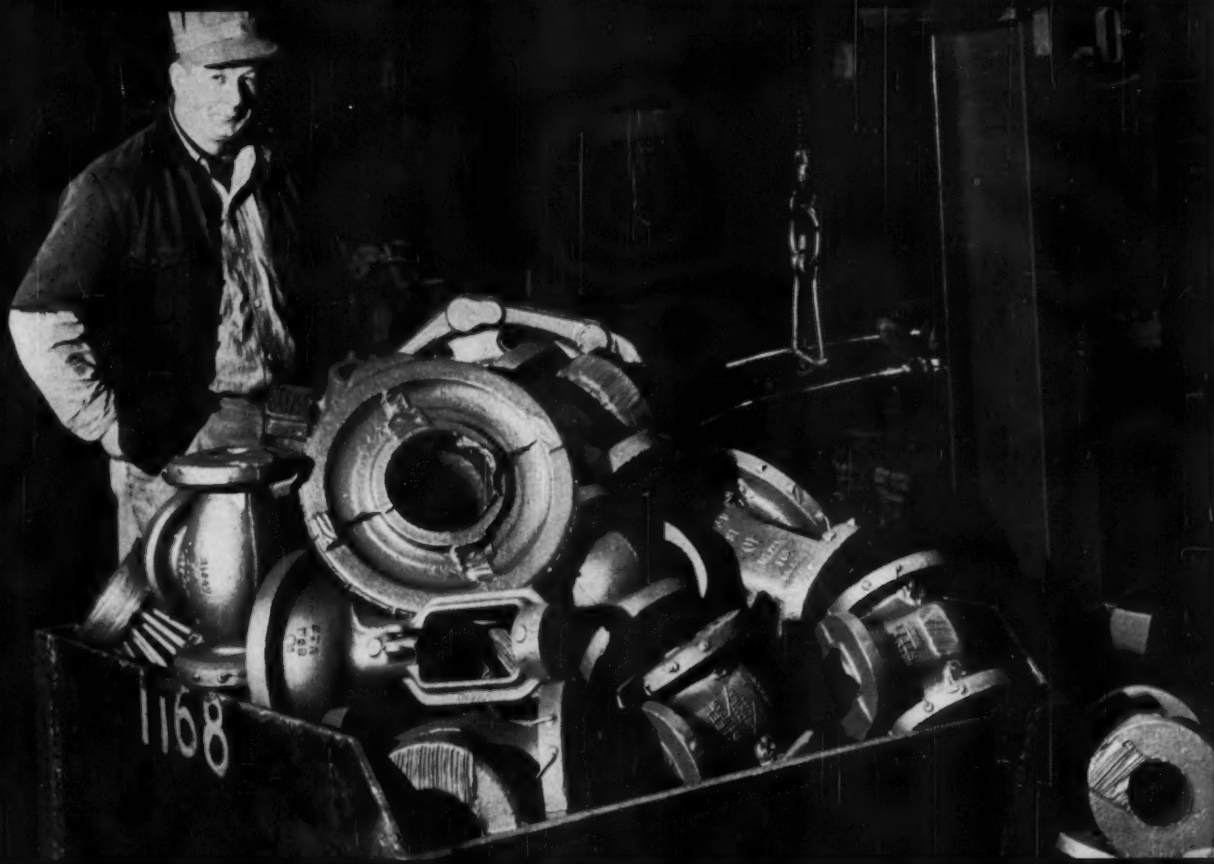
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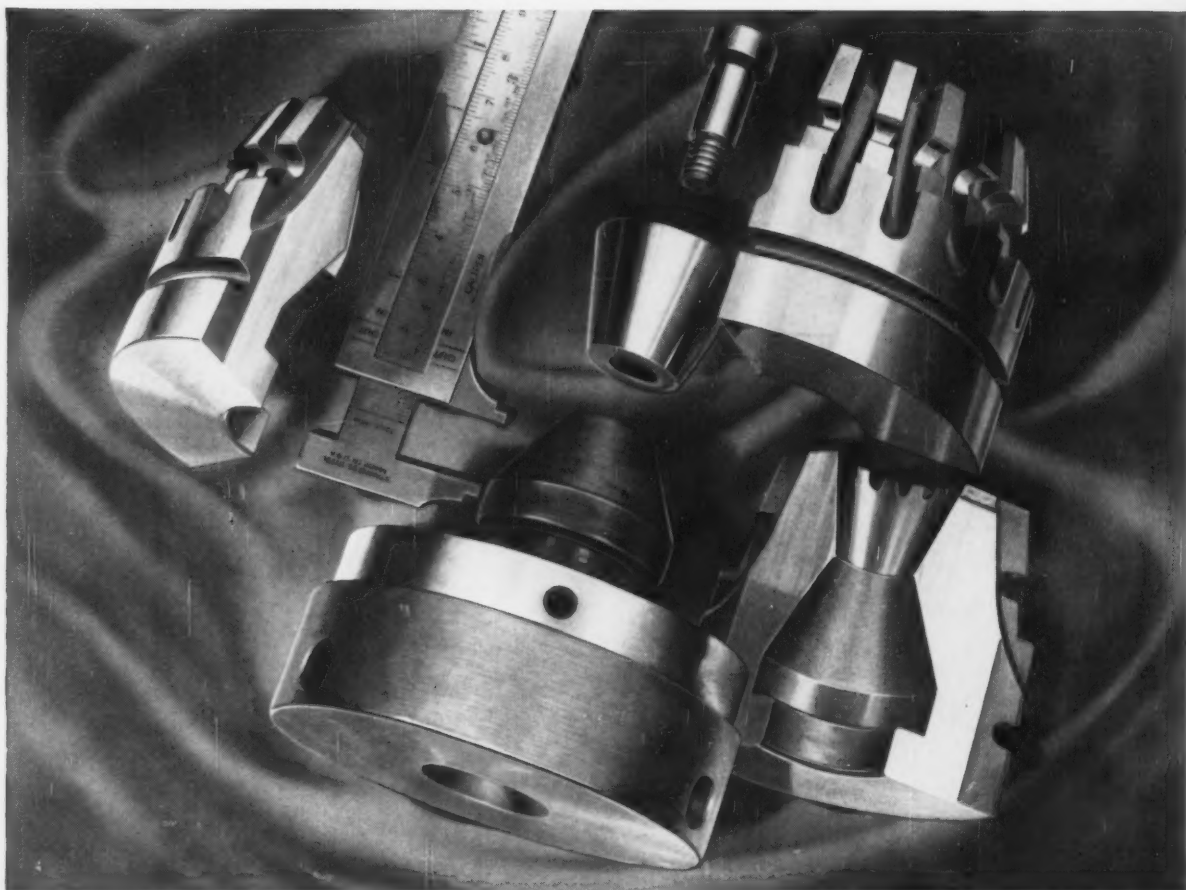
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